AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

1. CONTRACT ID CODE	PAGE OF PAGES
J	1 of 7

2. AMENDMENT/MODIFICATION NO.	3. EFFECTIVE DATE	4. REQUISITION/PURCHASE REQ. NO.	5. PROJECT NO.(If applicable)
0003	28-Jun-2004	W16ROE-4100-7736	

6. ISSUED BY	CODE	7. ADMINISTERED BY (If other than item 6)	CODE
USA ENGINEER DISTRICT, NEW YORK ATTN:CENAN-CT ROOM 1843 26 FEDERAL PLAZA NEW YORK NY 10278	W912DS	See Item 6	

8. NAME AND ADDRESS OF CONTRACTOR (No., Street, County, State and Zip Code)		
	X	9A. AMENDMENT OF SOLICITATION NO. W912DS-04-R-0006
	X	9B. DATED (SEE ITEM 11) 09-Jun-2004
		10A. MOD. OF CONTRACT/ORDER NO.
		10B. DATED (SEE ITEM 13)
CODE / FACILITY CODE		

11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS

[X] The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offer [ ] is extended, [X] is not extended.

Offer must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended by one of the following methods: (a) By completing Items 8 and 15, and returning _____ copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided each telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

12. ACCOUNTING AND APPROPRIATION DATA (If required)

13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS. IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14.

[ ] A. THIS CHANGE ORDER IS ISSUED PURSUANT TO: (Specify authority) THE CHANGES SET FORTH IN ITEM 14 ARE MADE IN THE CONTRACT ORDER NO. IN ITEM 10A.

[ ] B. THE ABOVE NUMBERED CONTRACT/ORDER IS MODIFIED TO REFLECT THE ADMINISTRATIVE CHANGES (such as changes in paying office, appropriation date, etc.) SET FORTH IN ITEM 14, PURSUANT TO THE AUTHORITY OF FAR 43.103(B).

[ ] C. THIS SUPPLEMENTAL AGREEMENT IS ENTERED INTO PURSUANT TO AUTHORITY OF:

[ ] D. OTHER (Specify type of modification and authority)

E. IMPORTANT: Contractor [ ] is not, [ ] is required to sign this document and return _____ copies to the issuing office.

14. DESCRIPTION OF AMENDMENT/MODIFICATION (Organized by UCF section headings, including solicitation/contract subject matter where feasible.)

The purpose of Amendment 0003 is to do the following changes to W912DS-04-R-0006, Explosive Research and Development Loading Facility: Delete attachment A in its entirety and replace with new attachment A- Room -by-room Requirements. Delete Attachment D in its entirety and replace with new attachment D - Environmental Assessment. Add Geotechnical Investigation Final Report to Attachment L. Add to Section 00120 Apendix B- Project Fact Sheet, Appendix C- Contracts in progress, and Appendix D- Past Performance Questionnaire.

The closing date for Offer remains unchanged, 23 July 2004 at 2:00:00 PM EST.

See Continuation Page of the SF 30.

Except as provided herein, all terms and conditions of the document referenced in Item 9A or 10A, as heretofore changed, remains unchanged and in full force and effect.

15A. NAME AND TITLE OF SIGNER (Type or print)		16A. NAME AND TITLE OF CONTRACTING OFFICER (Type or print) TEL: EMAIL:	
15B. CONTRACTOR/OFFEROR _____ (Signature of person authorized to sign)	15C. DATE SIGNED	16B. UNITED STATES OF AMERICA BY _____ (Signature of Contracting Officer)	16C. DATE SIGNED 28-Jun-2004

SECTION SF 30 BLOCK 14 CONTINUATION PAGE

SUMMARY OF CHANGES

SECTION SF 30 - BLOCK 14 CONTINUATION PAGE

The following have been added by full text:

NOTE

NOTE: NOTE: Bidders must acknowledge receipt of this amendment by the date specified in the solicitation by one of the following methods: in the space provided on the SF 1442, by separate letter, or by telegram, or by signing block 15 below. FAILURE TO ACKNOWLEDGE AMENDMENTS BY THE DATE AND TIME SPECIFIED MAY RESULT IN REJECTION OF YOUR BID IN ACCORDANCE WITH THE LATE BID, LATE MODIFICATIONS OF BIDS OR LATE WITHDRAWAL OF BIDS CLAUSE (FAR 14.304).

SECTION 00120

APPENDIX B

PROJECT FACT SHEET
(FOR COMPLETED and TERMINATED PROJECTS)

PROJECT NAME:

LOCATION:

TYPE OF FACILITY:

CONTRACT TYPE (i.e., Fixed Firm Price, Cost plus Fixed Fee, etc.)

SCOPE OF WORK:

STATEMENT OF PROJECT RELEVANCE

AWARD PRICE

*FINAL PRICE

PERCENTAGE OF WORK SUBCONTRACTED

CLIENT/AGENCY

CLIENT/AGENCY ADDRESS

POINT OF CONTACT AND PHONE NUMBER

START DATE

ORIGINAL COMPLETION DATE

**ACTUAL COMPLETION DATE

(*) Provide a narrative explanation for cost growth for each project.

(**) Provide a narrative explanation for schedule growth for each project.

(The Offeror shall provide the location, dollar value, client/agency, for any contract terminated for default or convenience within the past 5 years and explain the reason for the termination).

APPENDIX C

CONTRACTS IN PROGRESS
(All projects in the past 5 years)

PROJECT NAME:

LOCATION:

TYPE OF FACILITY:

CONTRACT TYPE: (i.e., Fixed Firm Price, Cost plus Fixed Fee, etc.)
SCOPE OF WORK:

STATEMENT OF PROJECT RELEVANCE

AWARD PRICE

*CURRENT PRICE

PERCENTAGE OF WORK SUBCONTRACTED

CLIENT/AGENCY

CLIENT/AGENCY ADDRESS

POINT OF CONTACT AND PHONE NUMBER

START DATE

ORIGINAL COMPLETION DATE

**SCHEDULED COMPLETION DATE

PERCENTAGE COMPLETE

(*) Provide a narrative explanation for cost growth for each project.

(**) Provide a narrative explanation for schedule growth for each project.

APPENDIX D

PAST PERFORMANCE QUESTIONNAIRE

THIS QUESTIONNAIRE IS FOR SOLICITATION NUMBER W912DS-04-R-0006

PROJECT: DESIGN BUILD CONTRACT FOR EXPLOSIVE R&D LOADING FACILITY, PICATINNY, PICATINNY NEW JERSEY

The U.S. Army Corps of Engineers, New Yo rk District, is interested in your assessment of the named company's "Past Performance". **Past Performance** refers to the company's record of conforming to contract requirements and to standards of good workmanship; the company's record of forecasting and controlling costs; the company's adherence to contract schedules including the administrative aspects of performance; the company's history of reasonable and cooperative behavior and commitment to customer satisfaction; and the company's general business-like concern for the interest of the customer. These questions relate to the work performed by:

1._____
(Name of Offeror)

2. _____
(Past Project Name & Location)

3. **Contract Amount**: _____
Contract Completion Date: _____
Percent of Completion (if project is currently under construction) _____

4. **Client Name/Title** _____
Telephone _____
Fax _____
E-Mail Address _____
Date _____

5. **(Brief Description of Project)** (Include, as applicable, how project is similar in scope and magnitude to the work required in this RFP- **Offeror may input into this line item**.)

_____

_____

_____

_____

_____

6. List and explain any customer concerns or dissatisfaction. _____

_____

_____

_____

_____

_____

7. How would you rate the performance of this Contractor on Your project?

a. Conformance to contract requirements and standards of good workmanship.

Excellent Good Satisfactory Fair Unsatisfactory

b. Adherence to contract schedules.

Excellent Good Satisfactory Fair Unsatisfactory

c. Reasonable and cooperative behavior and commitment to customer satisfaction.

Excellent Good Satisfactory Fair Unsatisfactory

d. Conformance to contract safety requirements.

Excellent Good Satisfactory Fair Unsatisfactory

e. Contractor's price, in terms of initial price and control of changes or claims.

Excellent Good Satisfactory Fair Unsatisfactory

"QUESTIONNAIRES MUST BE RECEIVED BY 2 3 July 2004, 2:00:00 PM EST"

Return to: U.S. Army Corps Of Engineers,

New York District
Contracting Division, Attn: Lorretta Parris/Scott Helmer

Jacob K. Javits Federal Buildi ng

26 Federal Plaza, Room 1843
New York, N.Y. 10278-0090
Ph: (212) 264- 4863 (or 9118)
FAX: (212) 264-3013

FAXED COMPLETED QUESTIONNAIRES WILL ALSO BE ACCEPTED

(End of Summary of Changes)

ARCHITECTURAL ROOM BY ROOM REQUIREMENTS

ADMINISTRATION

ROOM	SPACE	ROOM SIZE		AREA	DOORS			CEILING HEIGHT		EQUIPMENT	FLOOR			INTERIOR WALL FINISHES			CEILING	EXTERIOR WALLS					(TYP) BAYS	HAZARDOUS	CONDUCTIVE/SPARK RESISTANT CONCRETE FLOORING
NUMBER	NAME	WIDTH	LENGTH	[sqft]	TYPE	W	H	TO FINISH CEILING		REQUIRMENTS	SLOPE	DRAINAGE	FINISH	CLASS A	ACCOUSTIC WALLS	CERAMIC TILE		TRANSLUCENT	CMU	REINFORCED CONCRETE	WINDOWS	EIFS		MATERIAL	
From Milling area to Bldg. 225 (+/-)	ENCLOSED WALKWAY WITH WEATHER PANELS	5' clear	472' (+/-)	2,360	As required			10' - clear					Concrete					yes							
100	LOBBY	Space allotment	Space allotment	100				9' - clear						yes	yes		UFGS 09510		yes			yes			
101	OPEN PLAN FOR OFFICES	Space allotment	Space allotment	560	D	6'-0"	7'-0"	9' - clear					Carpet	yes	yes		UFGS 09510		yes		As required	yes			
102	BREAK ROOM	Space allotment	Space allotment	172	A	3'-0"	7'-0"	9' - clear					Carpet	yes	yes		UFGS 09510		yes		As required	yes			
103	CONFERENCE ROOM	Space allotment	Space allotment	240	A	3'-0"	7'-0"	9' - clear					Carpet	yes	yes		UFGS 09510		yes		As required	yes			
104	MEN'S RESTROOMS	Space allotment	Space allotment	224	A	3'-0"	7'-0"	9' - clear		UFGS 10800, TOILET ACCESSORIES	yes	Floor drain	Ceramic Tiles	yes	UFGS 10153 Type 1 Partitions	yes	UFGS 09510		yes			yes			
105	WOMEN'S RESTROOMS	Space allotment	Space allotment	224	A	3'-0"	7'-0"	9' - clear		UFGS 10800, TOILET ACCESSORIES	yes	Floor drain	Ceramic Tiles	yes	UFGS 10153 Type 1 Partitions	yes	UFGS 09510		yes			yes			
106	JANITOR'S CLOSET	Space allotment	Space allotment	30	A	3'-0"	7'-0"	9' - clear		WALL SERVICE SINK	yes	Floor drain	Ceramic Tiles	yes		yes	UFGS 09510		yes			yes			
								TO STRUCTURE	TO EQUIPMENT																
107	ELECTRICAL	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			
108	COMMUNICATIONS	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			

PROCESSING

								TO STRUCTURE	TO EQUIPMENT																
From Milling area to end of Magazine (+/-)	ENCLOSED WALKWAY	8' - clear	598' (+/-)	4,784	As Required			10' - clear			yes		Concrete				UFGS 09250	yes				yes			
	LOADING DOCK (Covered)	Space allotment	Space allotment	400						See Civil, 2.8 Paragraph	yes		Concrete												
200	WASHING & DRYING	Space allotment	Space allotment	110	A	3'-0"	7'-0"	12' - clear	10' - clear	See Arch. 01010 4.4.2.8 LAUNDRY	yes	Floor drain	Ceramic Tiles	yes	yes	yes	UFGS 09250		yes			yes			
201	MECHANICAL ROOM	Space allotment	Space allotment	546	D	6'-0"	7'-0"	12' - clear	10' - clear	`	yes			yes	yes		UFGS 09250		yes			yes			
202	FIRE SPRINKLER	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			
203	ELECTRICAL	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			
204	COMMUNICATIONS	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			
205	NOT USED																								
206	MELT/POUR	24'- clear	24'-clear	576	E	6'-0"	8'-0"	12' - clear	10' - clear	2xKettles, 1xOven, Crane 1/2ton, wall mount	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	350 lbs	See UFGS 09965N
207	DRYING OVEN	16'- clear	24'-clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear	1x Drying Oven W/D/H 84"/64"/68"	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
207A	UTILITY ROOM	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear						Yes		UFGS 09250		yes			yes			
208	HOLSTEN STILLS	16'- clear	24'-clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear	2x Holston Stell W/D/H 96"/57"/96"	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	130 lbs	See UFGS 09965N
209	CURING OVEN	16'- clear	24'-clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear		yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
210	BP MIXER	24'- clear	24'-clear	576	E	6'-0"	8'-0"	12' - clear	10' - clear	1x Mixer, Crane 1ton wall mount	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	130 lbs	See UFGS 09965N
211	ROTARY PRESS	20'- clear	24'-clear	480	E	6'-0"	8'-0"	12' - clear	10' - clear		yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
212	X-RAY ROOM	24'- clear	24'-clear	576	E	6'-0"	8'-0"	12' - clear	10' - clear		yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
213	TENNEY OVEN	16'- clear	24'-clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear	1x Oven W/D/H 50"/69"/90"	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
214	ASSEMBLY	20'- clear	24'-clear	480	E	6'-0"	8'-0"	12' - clear	10' - clear		yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
215	GRUENBERG OVEN ROOM 1	16'- clear	24'-clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear	2x Gruenberg Oven W/D/H 75"/75"/80"	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
215A	UTILITY ROOM	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			
216	INSPECTION	20'- clear	24'-clear	480	E	6'-0"	8'-0"	12' - clear	10' - clear		yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
217	GRUENBERG OVEN ROOM 2	16'- clear	24'-clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear	2x Gruenberg Oven W/D/H 75"/75"/80"	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
218	SHOP ROOM	20'- clear	29'- clear	580	E	6'-0"	8'-0"	12' - clear	10' - clear		yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	200 lbs	See UFGS 09965N
219	CONDITIONING OVEN	16'- clear	24'- clear	384	E	6'-0"	8'-0"	12' - clear	10' - clear	1x Curing Oven W/D/H 69"/65"/77"	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	100 lbs	See UFGS 09965N
219A	UTILITY ROOM	Space allotment	Space allotment	140	D	6'-0"	7'-0"	12' - clear	10' - clear					yes	yes		UFGS 09250		yes			yes			
220	CONTROL ROOM For Room 211	Space allotment	Space allotment	100	A	3'-0"	7'-0"	12' - clear	10' - clear				UFGS 09660	yes						yes	As required	yes			See (UFGS 09660 CONDUCTIVE VINYL FLOORING Aug. 2002)
221	CONTROL RM For Room 210	Space allotment	Space allotment	100	A	3'-0"	7'-0"	12' - clear	10' - clear				UFGS 09660	yes						yes	As required	yes			See (UFGS 09660 CONDUCTIVE VINYL FLOORING Aug. 2002)
222	CONTAMINATED WASTE WATER TANK	20'- clear	26'- clear	520	E	6'-0"	8'-0"	12' - clear	10' - clear											yes					

MACHINING

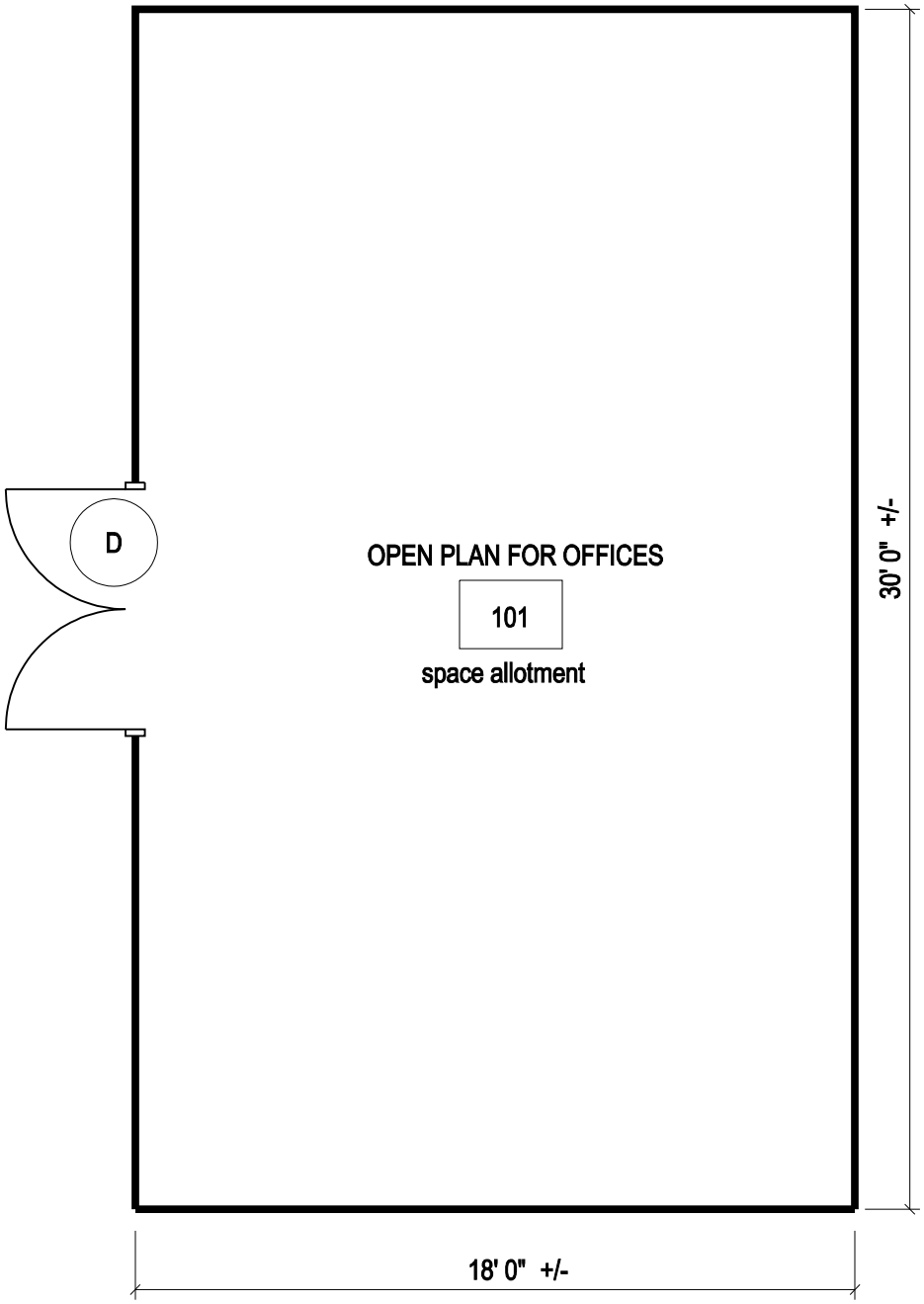
	INTERIOR WALKWAY	5' - clear	412' (+/-)	2,060	As Required			12' - clear	10' - clear		yes		UFGS 09965N	yes							As required	yes			See UFGS 09965N
300	CONTROL ROOM	Space allotment	Space allotment	100	A	3'-0"	7'-0"	12' - clear	10' - clear	Computer Control Equipment			UFGS 09660	yes						yes	As required	yes			See (UFGS 09660 CONDUCTIVE VINYL FLOORING Aug. 2002)
301	MACHINING ROOM 1	16'- clear	28'- clear	448	E	6'-0"	8'-0"	12' - clear	10' - clear	CNC Lathe W/D 8'/12'	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	50 lbs.	See UFGS 09965N
302	MACHINING ROOM 2	20'- clear	24' - clear	480				12' - clear	10' - clear	Drill Press W/D 4'-10"/5'	yes	yes: Trench	UFGS 09965N	yes						yes	As required	yes	(TYP) Utilities	50 lbs.	See UFGS 09965N
303 to 313	NOT USED																								
314	CONTROL ROOM	Space allotment	Space allotment	100	A	3'-0"	7'-0"	12' - clear	10' - clear	Computer Control Equipment			UFGS 09660	yes						yes	As required	yes			See (UFGS 09660 CONDUCTIVE VINYL FLOORING Aug. 2002)

MAGAZINE

	ENCLOSED WALKWAY				As Required			10' - clear			yes			yes				yes							
400	STORAGE	14' - clear	14' - clear	196				10' - clear			yes			yes						yes				400lbs.	See UFGS 09965N
401	STORAGE	14' - clear	14' - clear	196				10' - clear			yes			yes						yes				400lbs.	See UFGS 09965N
402	STORAGE	14' - clear	14' - clear	196				10' - clear			yes			yes						yes				400lbs.	See UFGS 09965N
403	STORAGE	14' - clear	14' - clear	196				10' - clear			yes			yes						yes				400lbs.	See UFGS 09965N
		TOTAL SQ FEET		**21,998**																					

UFGS Specification 07240, Exterior Insulation and Finish System
UFGS Specification 09250, Gypsum Board
UFGS Specification 09510, Suspended Acoustical Ceilings
UFGS Specification 09660, Conductive Vinyl Flooring
UFGN Specification 09965N, Metallic Type Conductive/Spark Resistance Concrete Floor Finish (Aug. 2001)
UFGS Specification 08800, Glazing
UFGS Specification 08510, Steel Windows or 08520, Aluminum Windows
UFGS Specification 10153, Toilete Partitions
UFGS Specification 10800, Toilete Accessories
(CMU) Wall construction, DA Pamphlet 385-64 and AMC-R 385-100
See Civil Specs. 2.8 Parking, Delivery Truck Access and Loading Dock Area

"E" type door to swing 180 degree to outside
modified as per email: 5/25/2004 Addition to RFP



TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

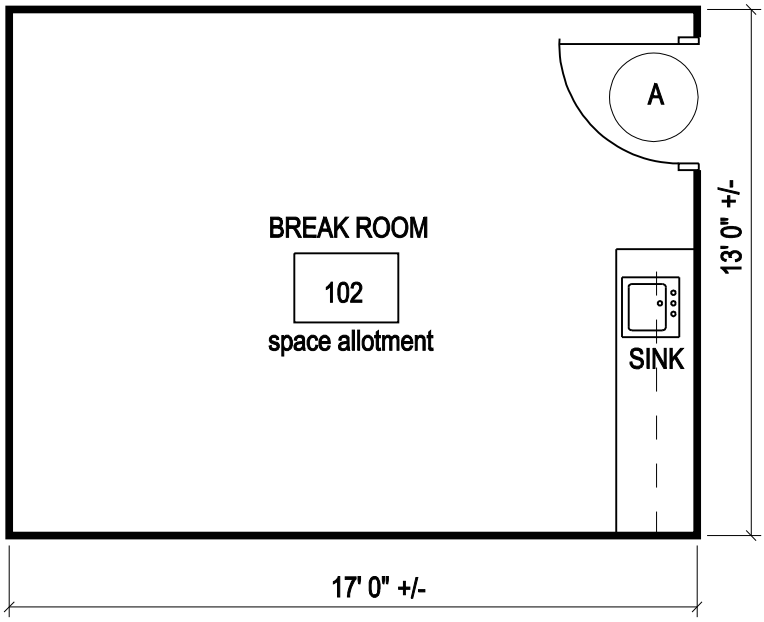
N

OPEN OFFICE SPACE

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

01



TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

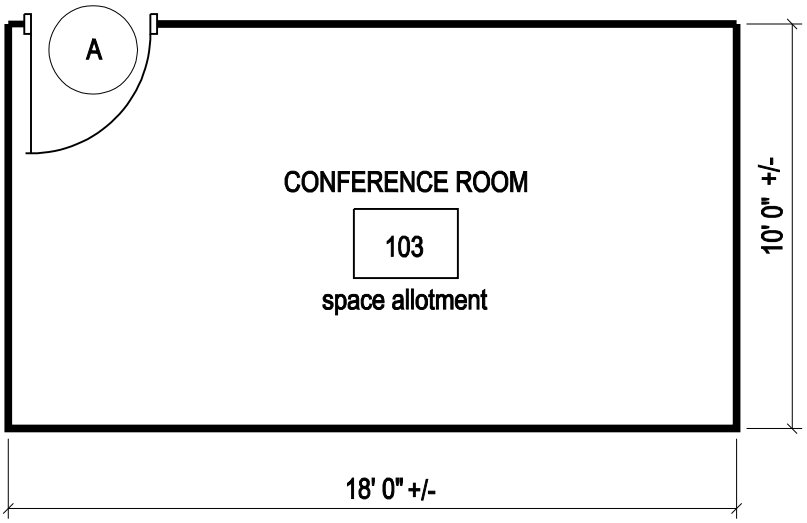
N

BREAK RM.

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

02



TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

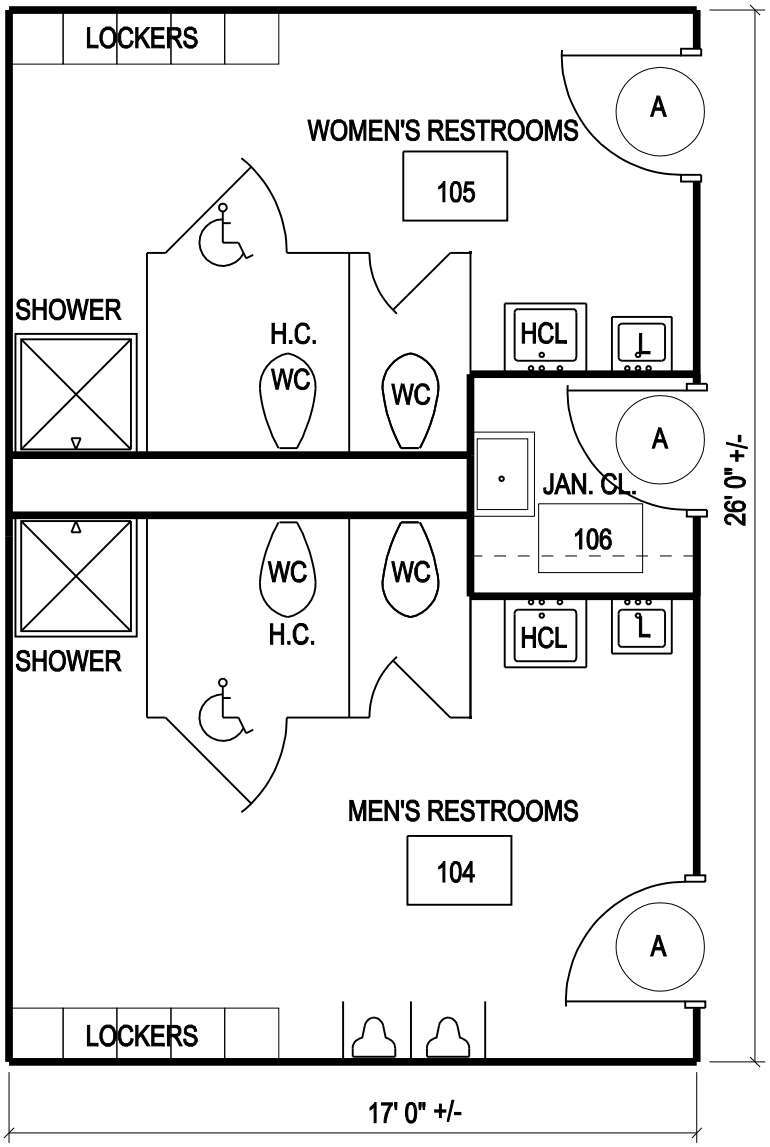
N

CONFERENCE RM

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

03



space allotment

LAYOUT SHOWM MIN. DIMENSIONS ONLY.
BATHROOMS SHALL BE FULLY DEVELOPED
BY THE DESIGNER.

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

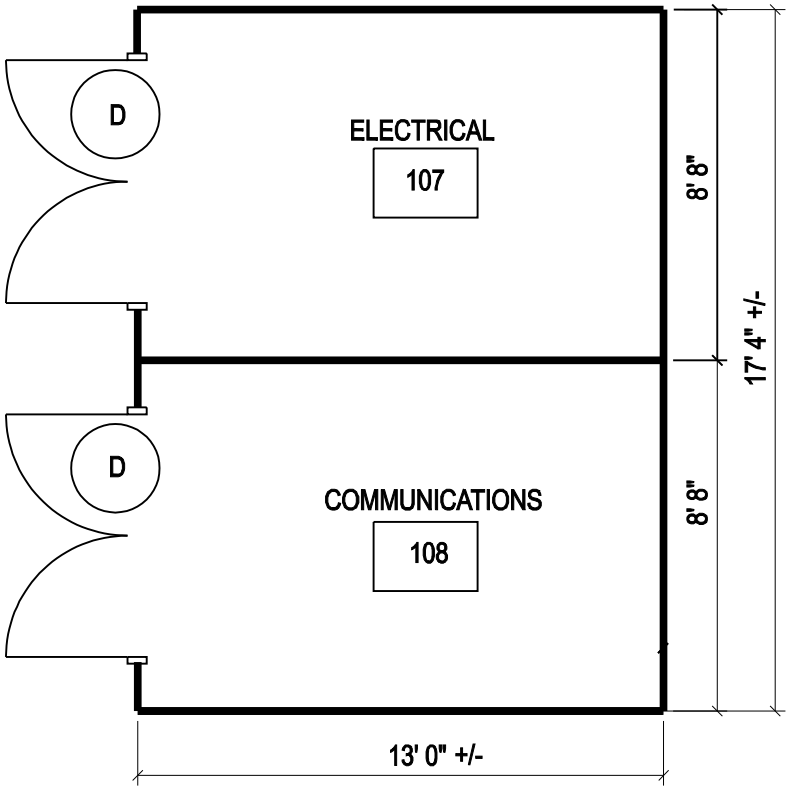
N

RESTROOMS

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

04



space allotment

Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

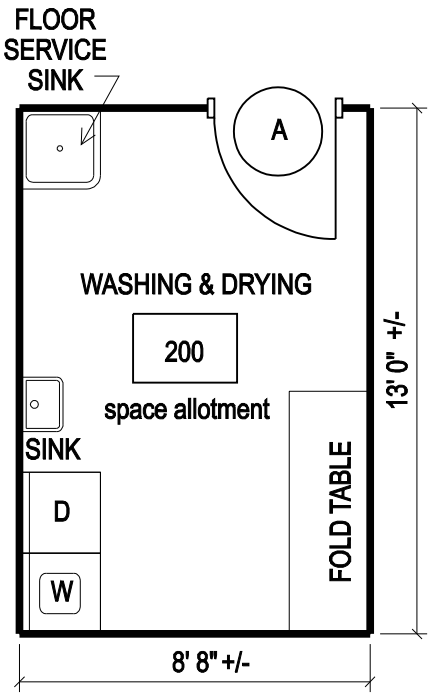
N

COMMUNICATIONS, ELECTRICAL

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

05



FOLD TABLE, WASHING & DRYING MACHINES
BY OTHERS

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

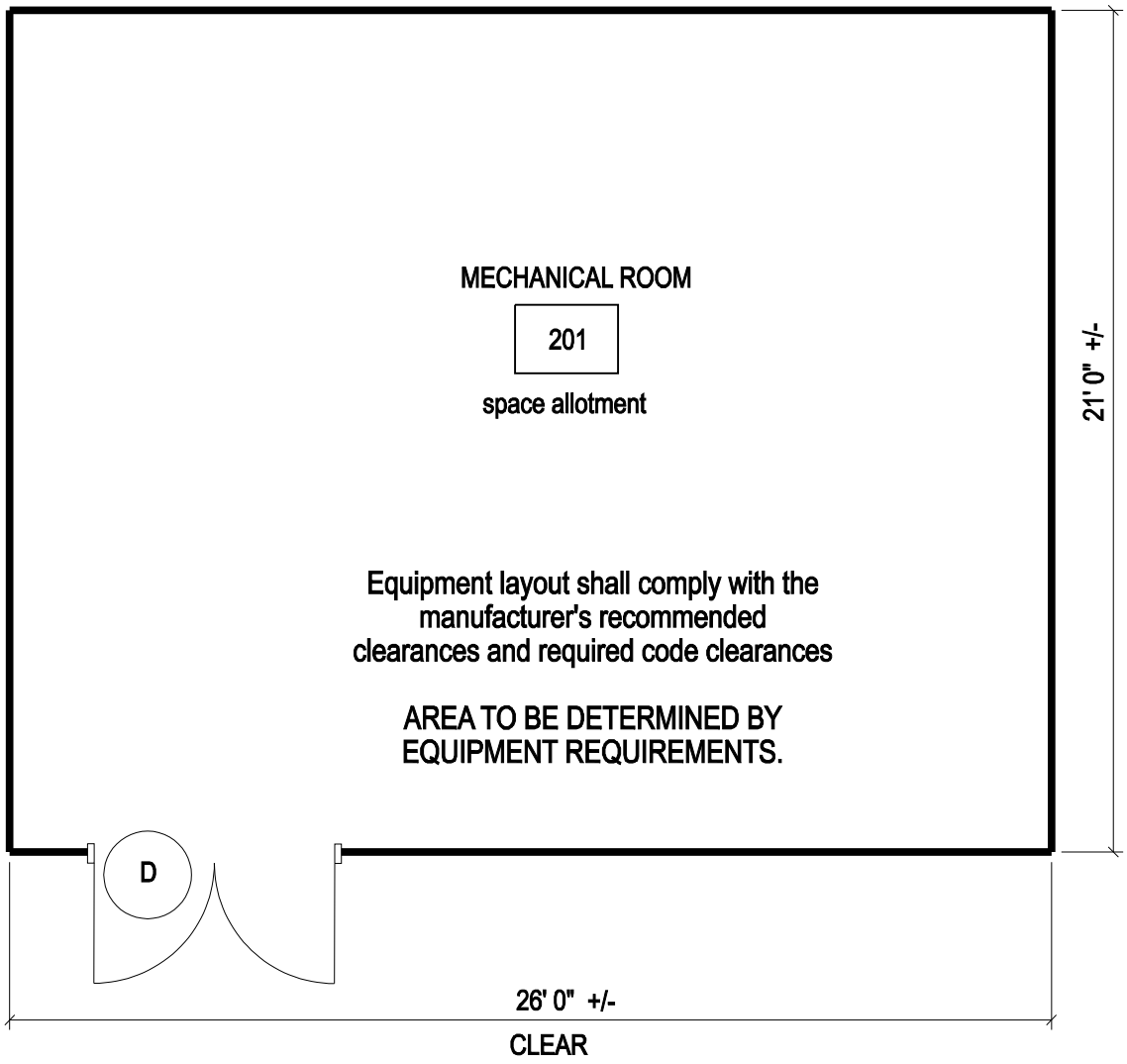
N

WASHING & DRYING

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

06



TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

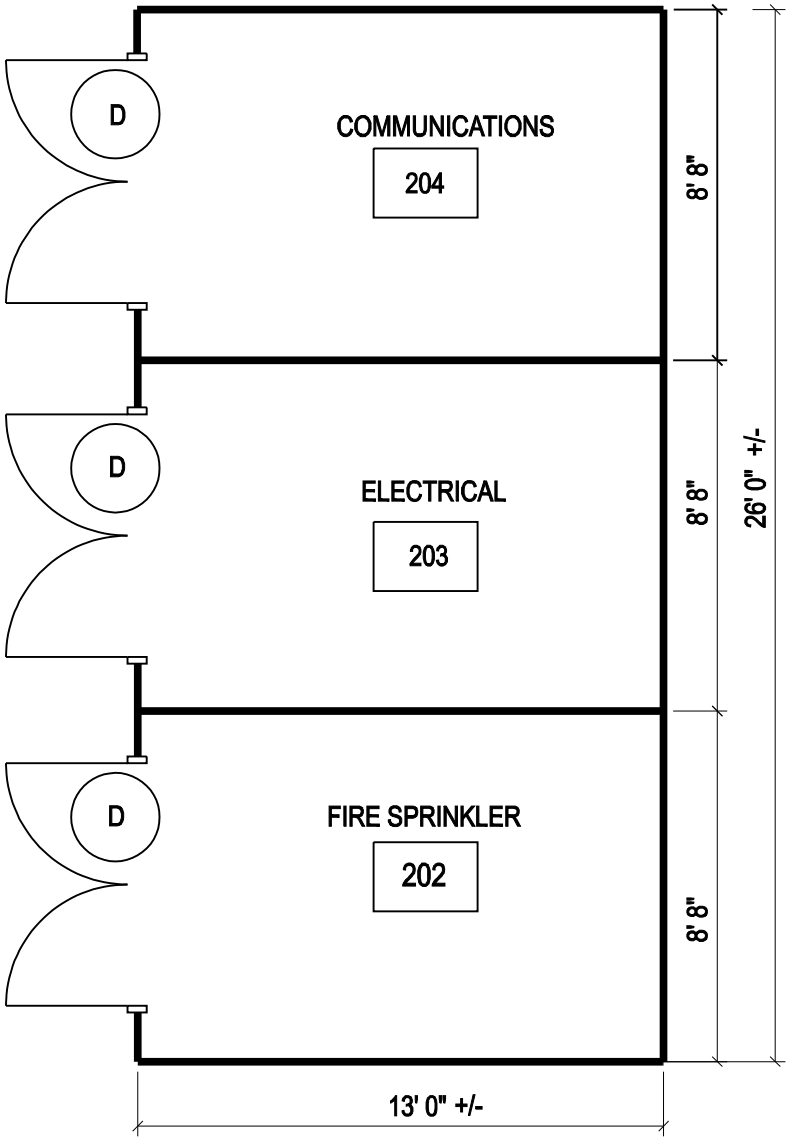
N

MECHANICAL RM.

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

07



space allotment

Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

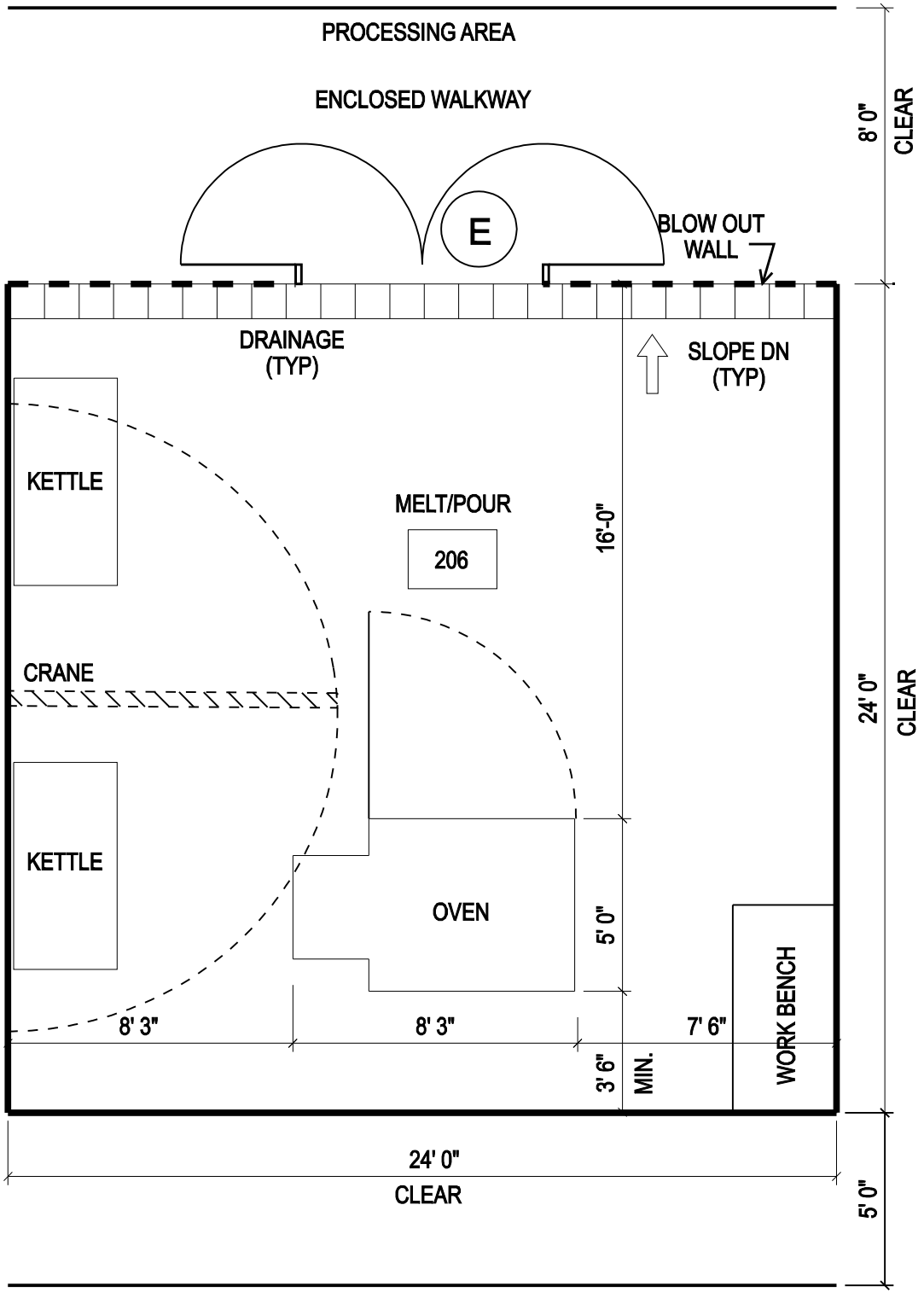
N

COMMUNICATIONS, ELECTRICAL & FIRE/SPRINKLER

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

08



TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

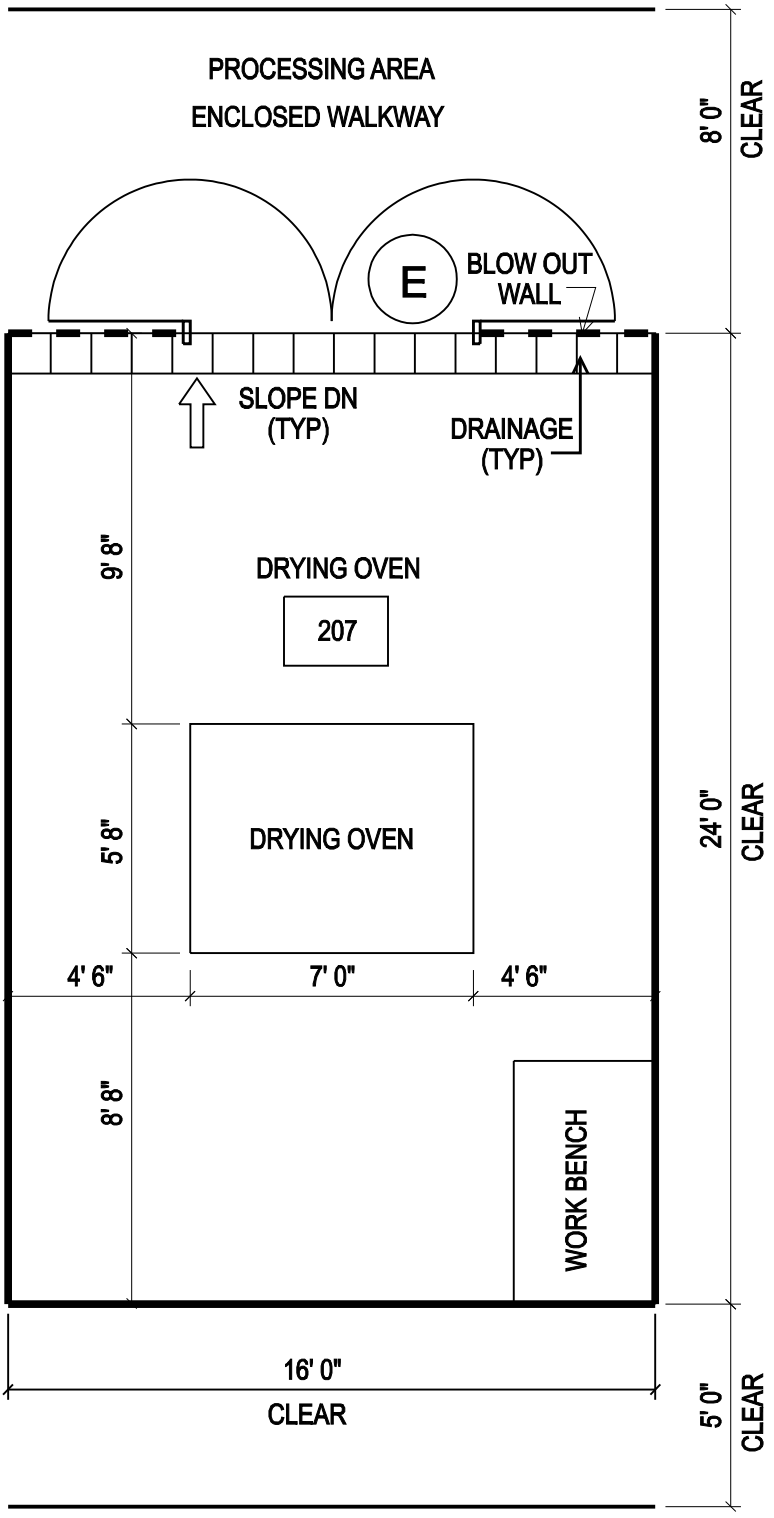
N

MELT POUR

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

09

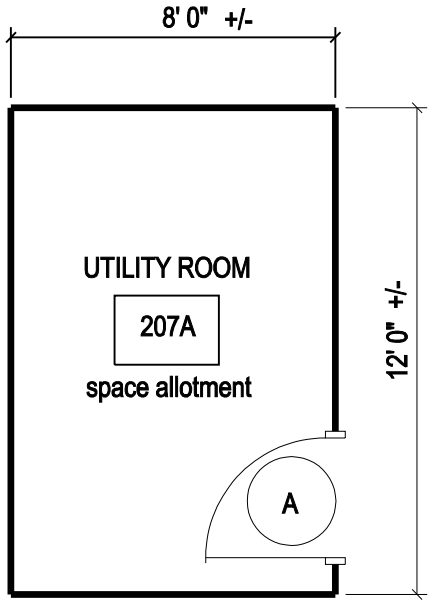


TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

DRYING OVEN

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

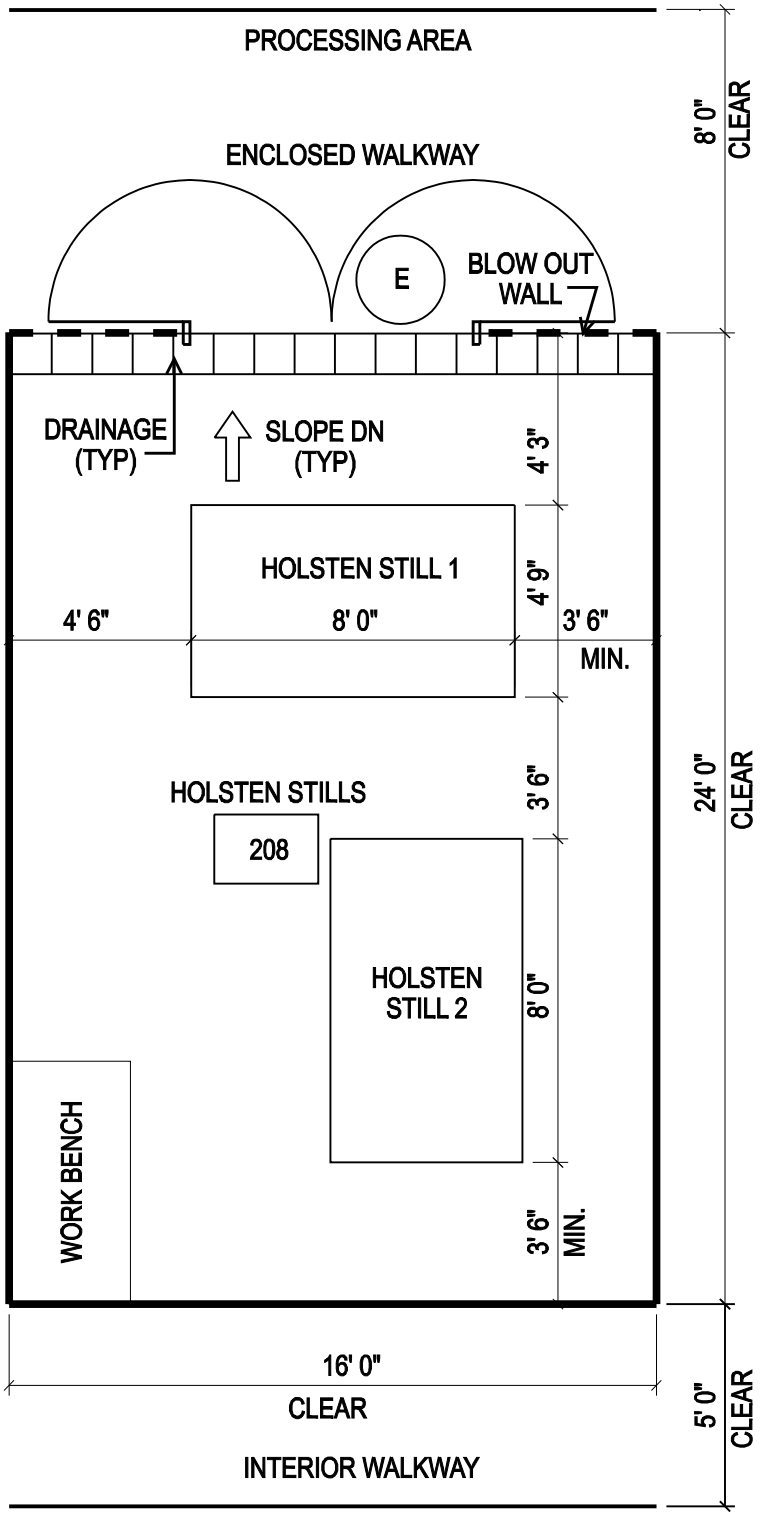
TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

N

UTILITY ROOM

(Adjacent space for room 207)

4' 3' 2' 1' 0' 5' 10' 15'

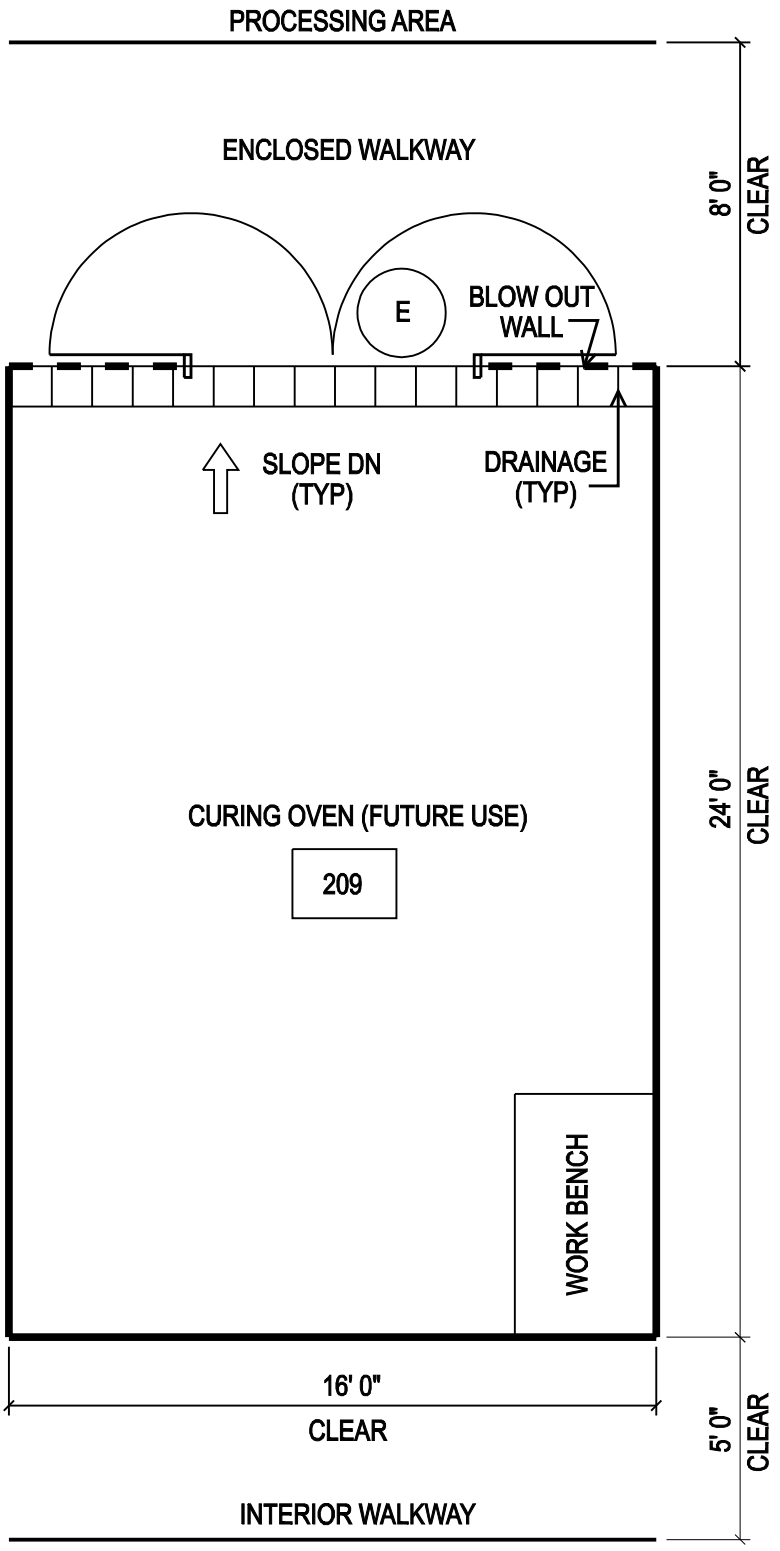


TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

HOLSTEIN STILLS

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



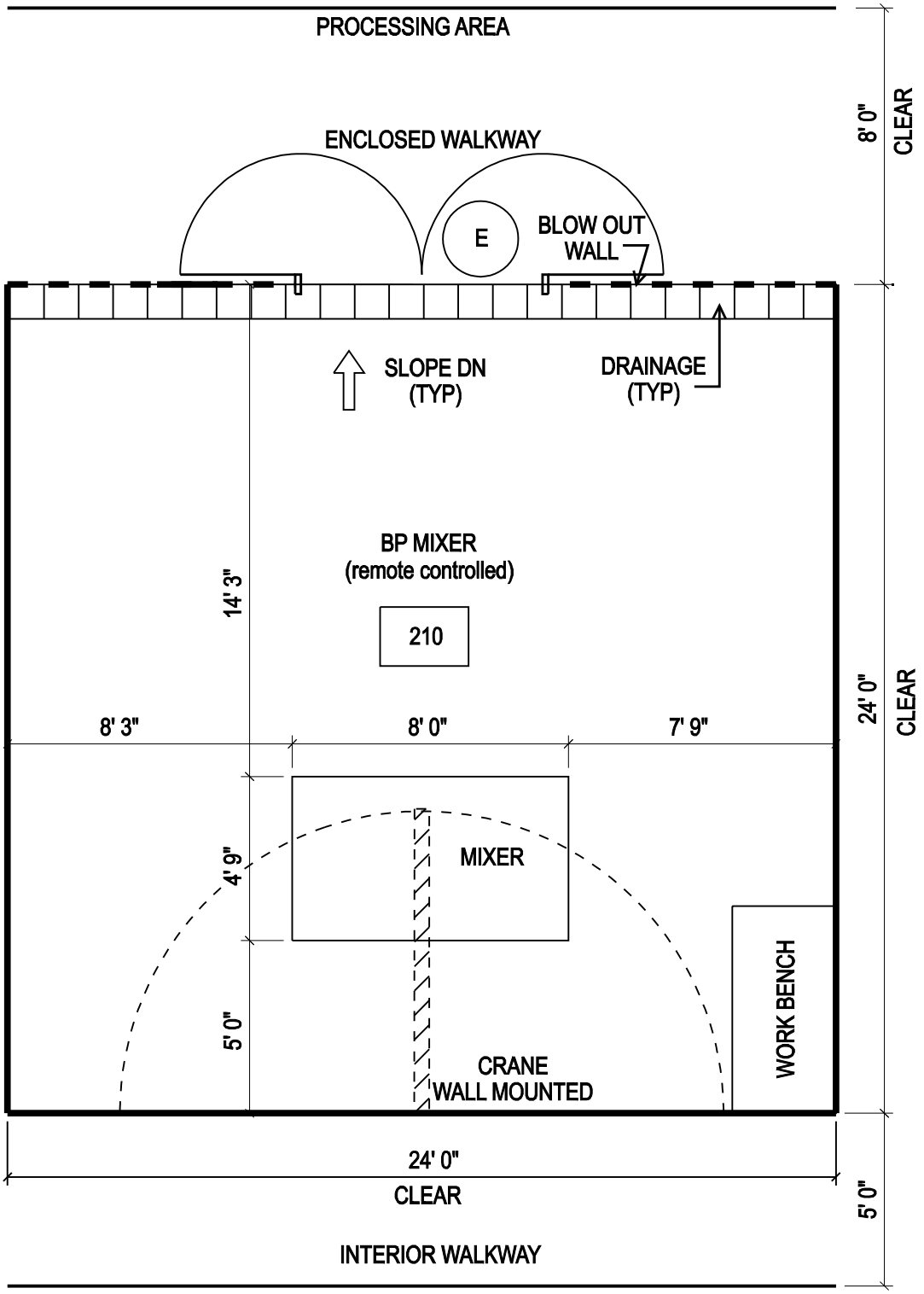
TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

N

CURING OVEN

4' 3' 2' 1' 0' 5' 10' 15'

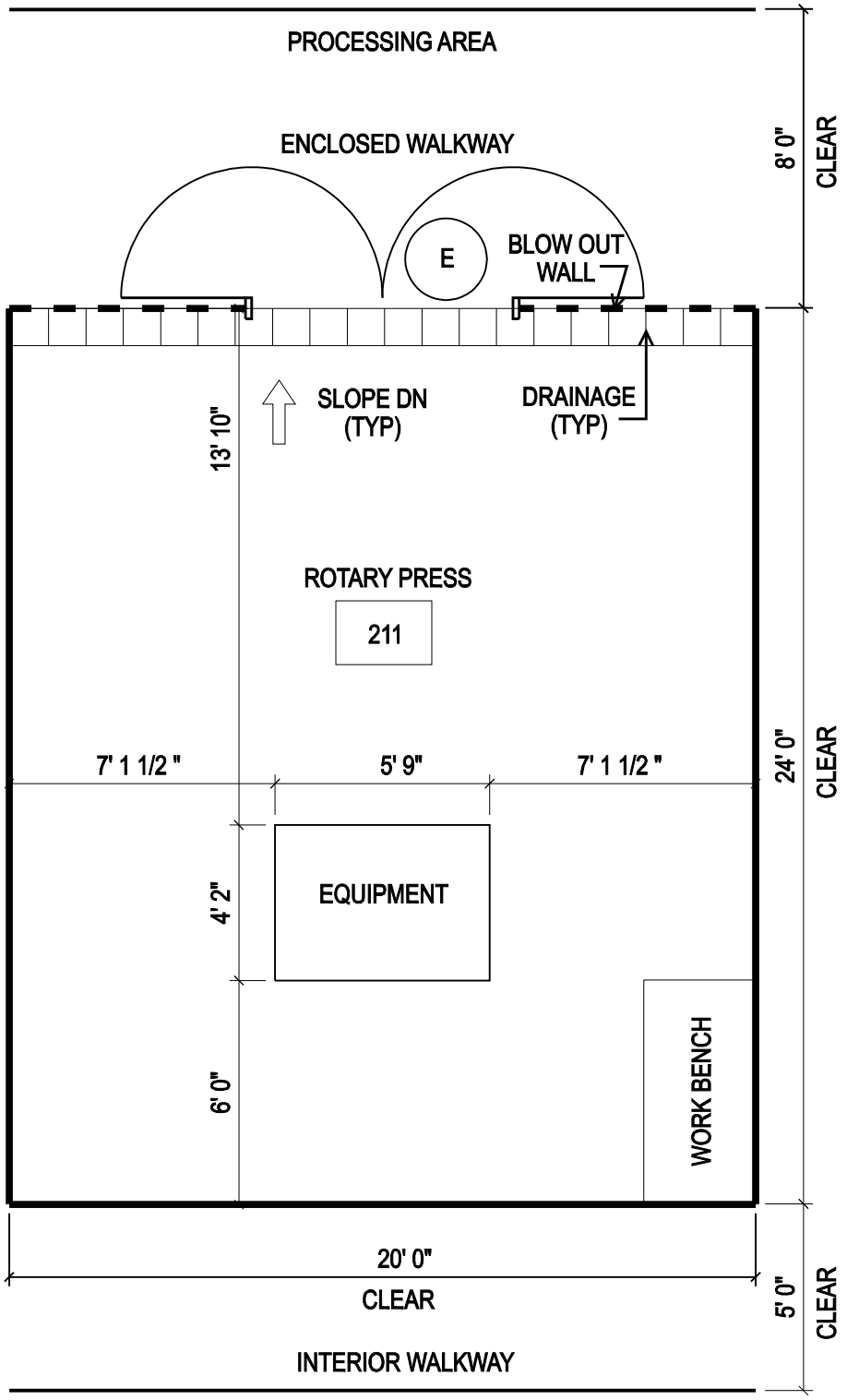
EXPLOSIVE R&D LOADING FACILITY



TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

BP MIXER

4' 3' 2' 1' 0' 5' 10' 15'



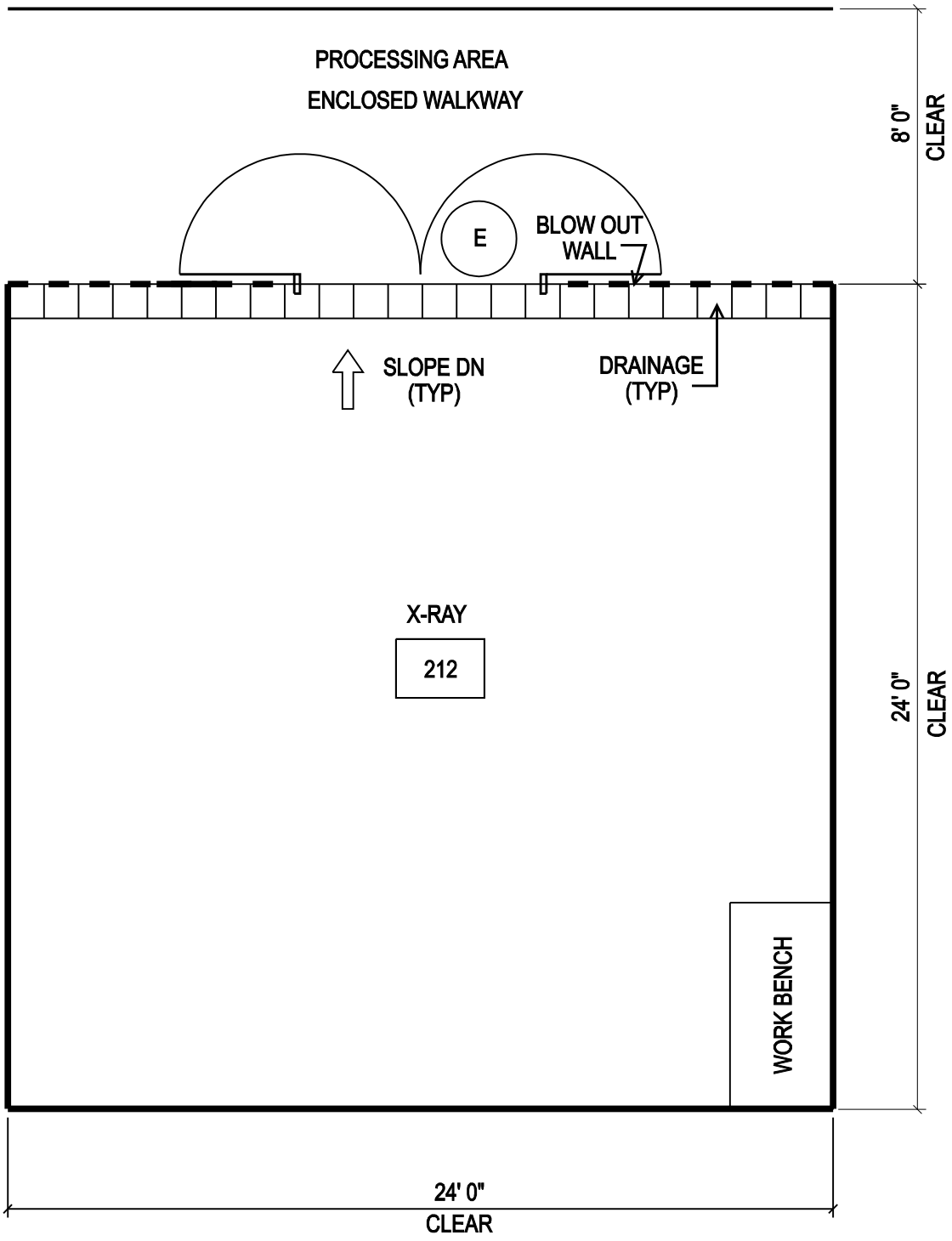
TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

N

ROTARY PRESS

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



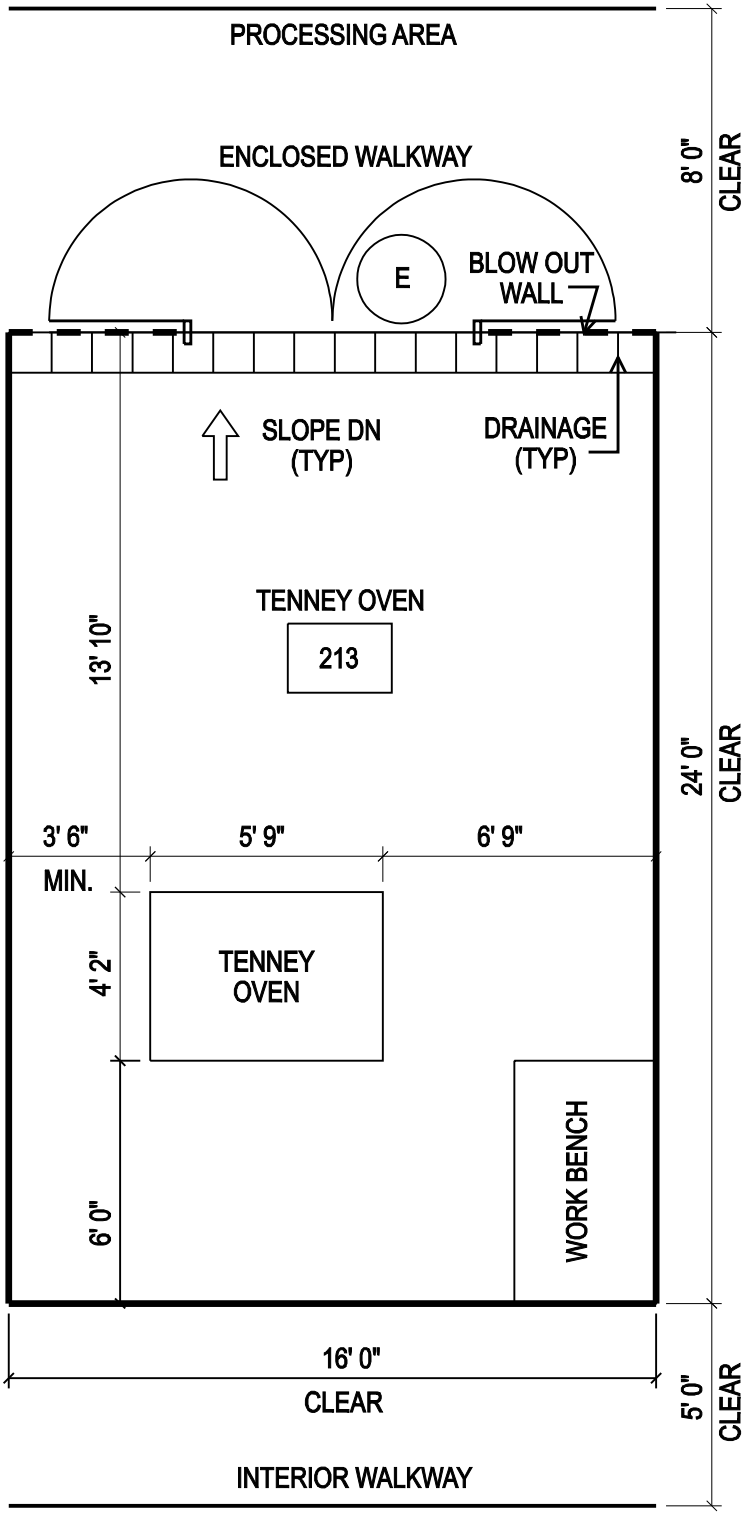
TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

N

X-RAY

4' 3' 2' 1' 0' 5' 10' 15'

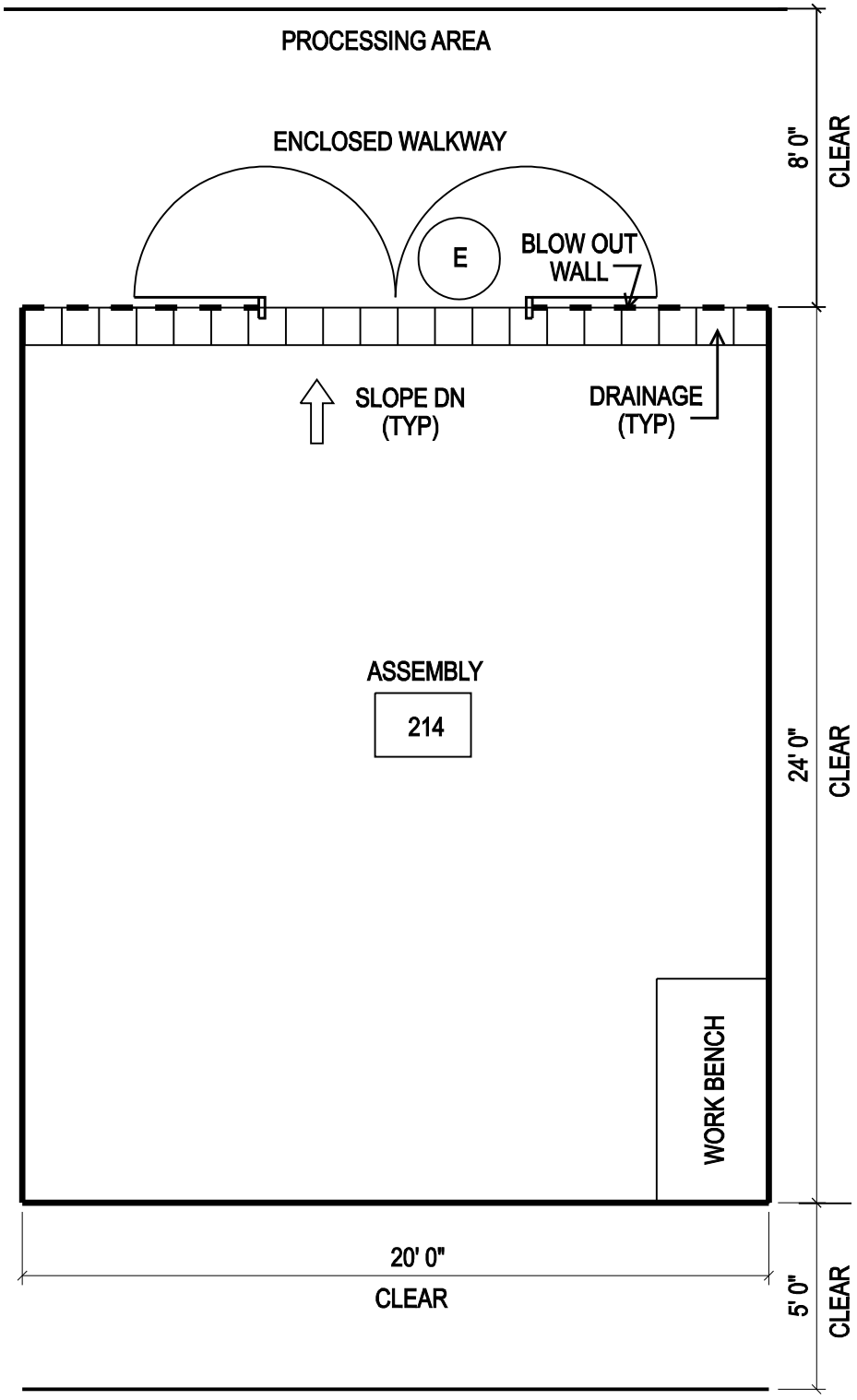
EXPLOSIVE R&D LOADING FACILITY



TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

TENNEY OVEN

4' 3' 2' 1' 0' 5' 10' 15'



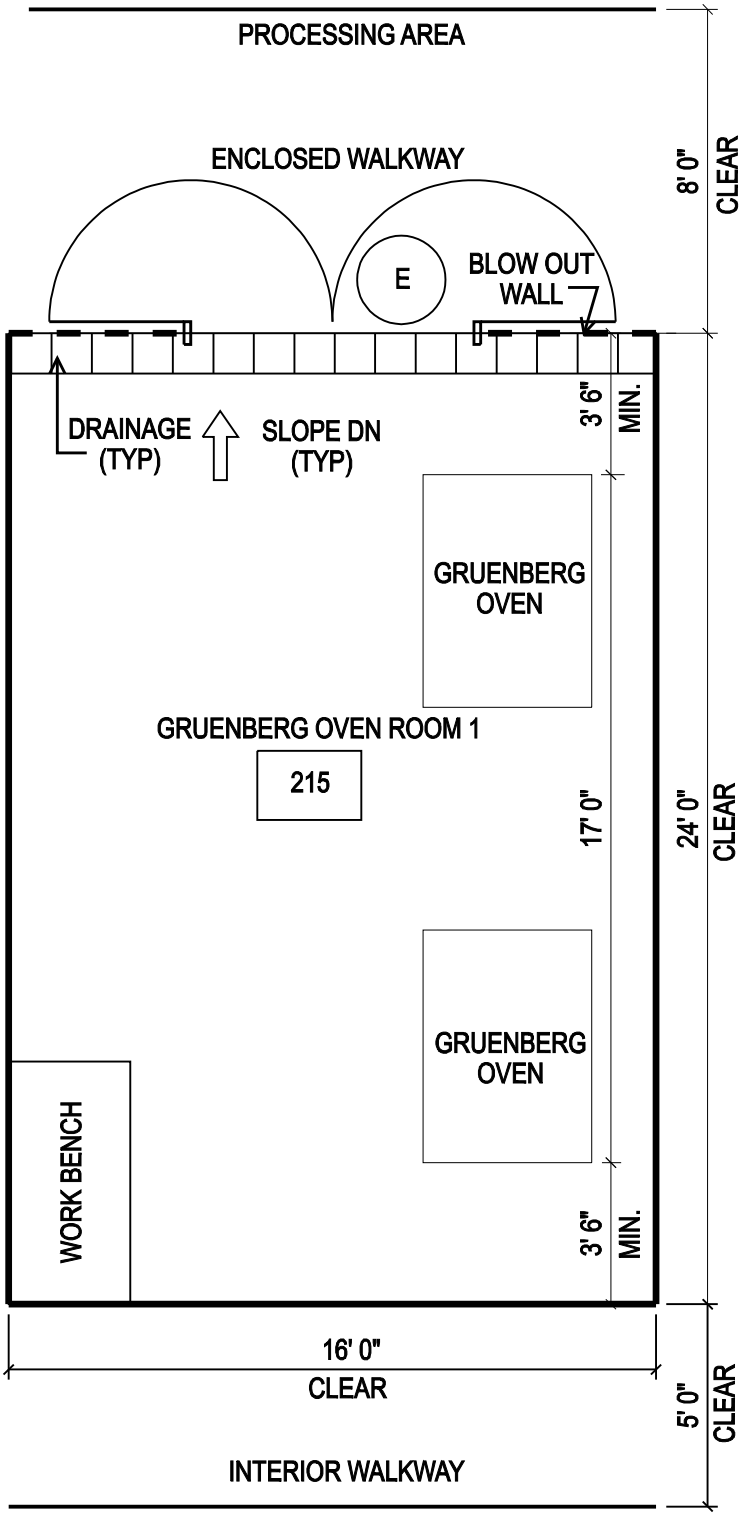
TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

N

ASSEMBLY

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



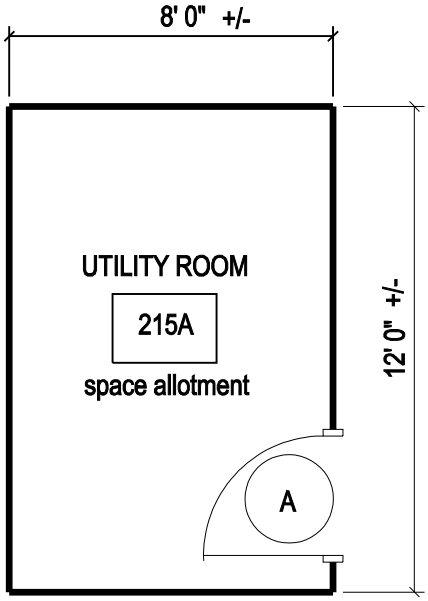
TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

N

GRUENBERG OVEN 1

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



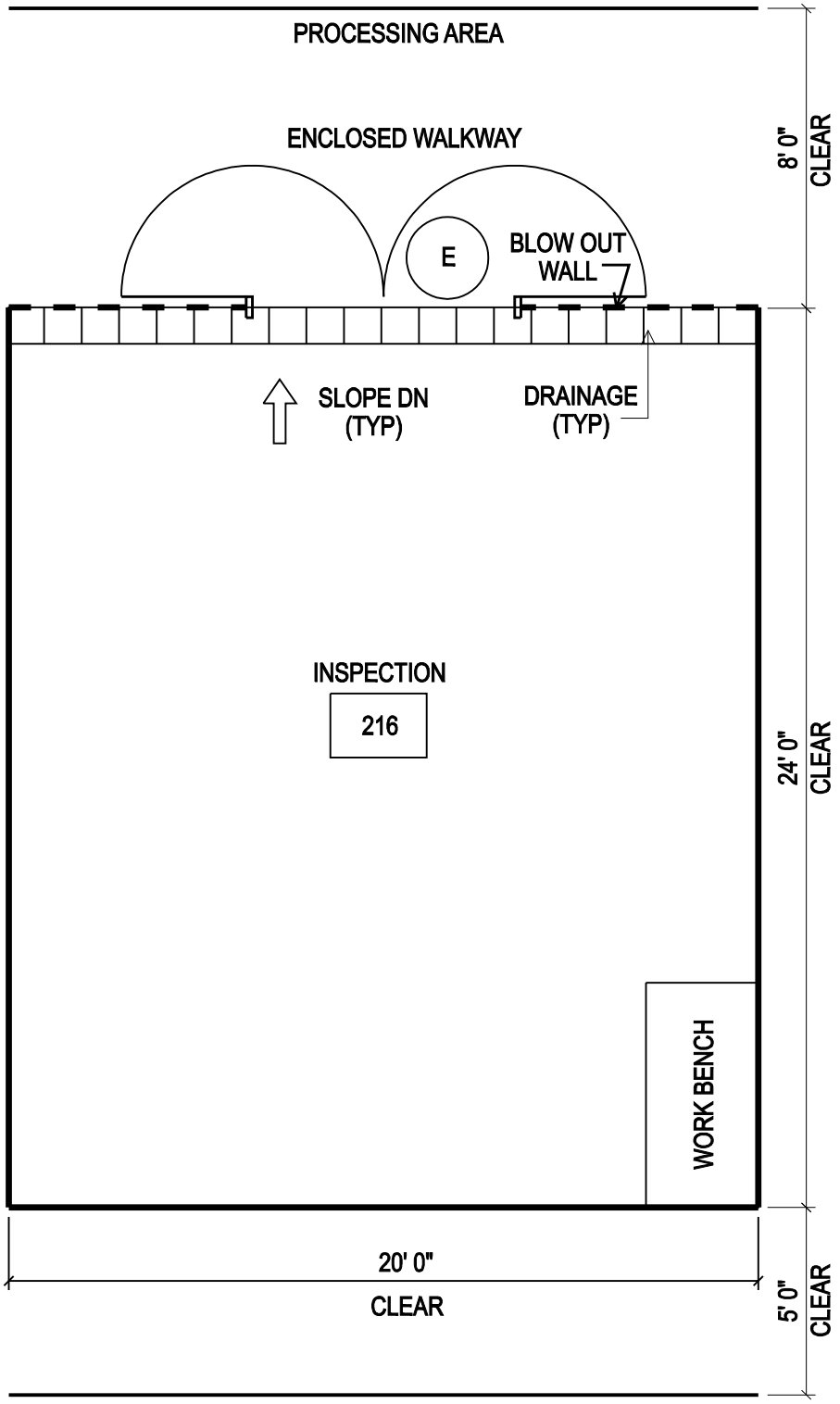
Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

UTILITY ROOM

(Adjacent space for mechanical equipment)

4' 3' 2' 1' 0' 5' 10' 15'



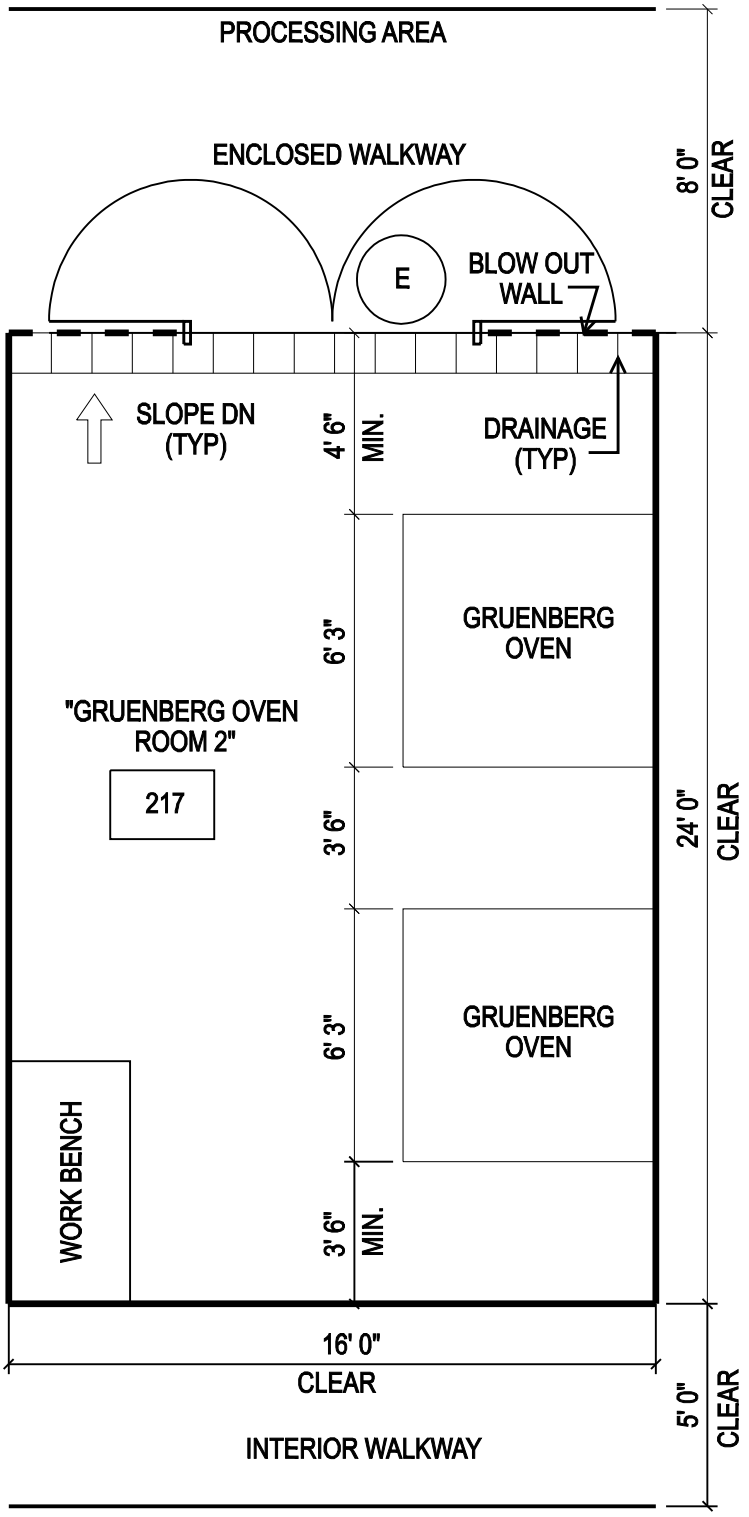
TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

N

INSPECTION

4' 3' 2' 1' 0' 5' 10' 15'

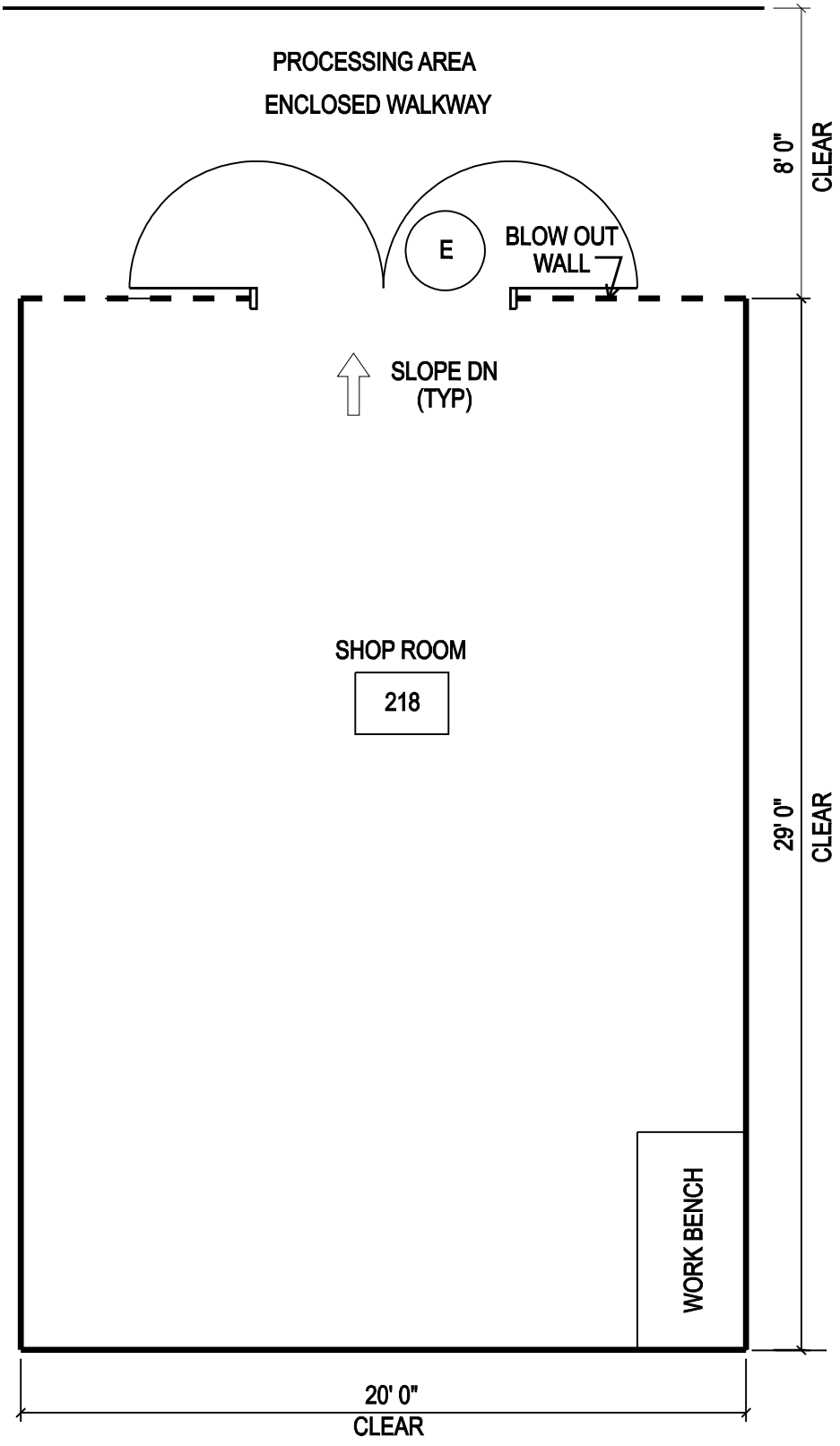
EXPLOSIVE R&D LOADING FACILITY



TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

GRUENBERG OVEN 2

4' 3' 2' 1' 0' 5' 10' 15'



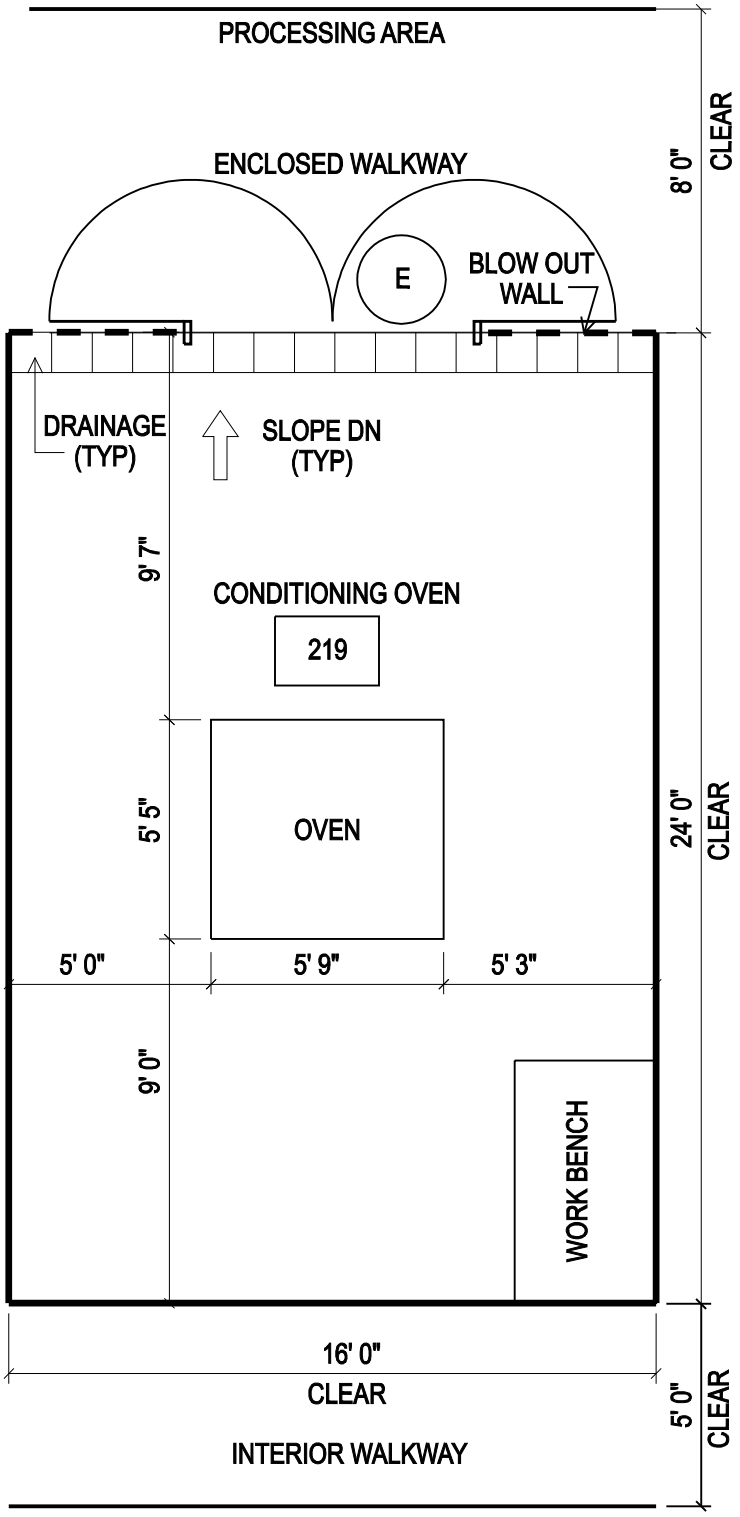
TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

N

SHOP ROOM

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



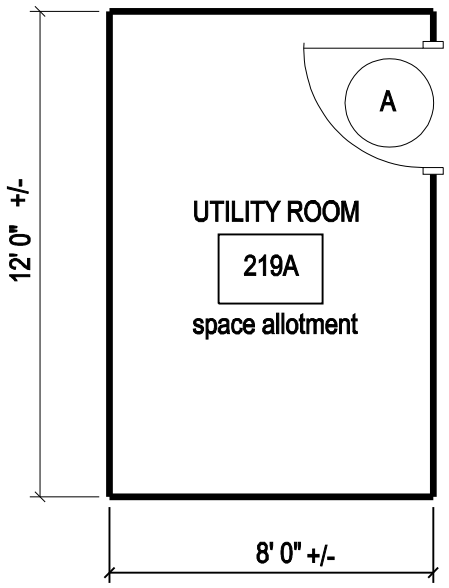
TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

N

CONDITIONING OVEN

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY

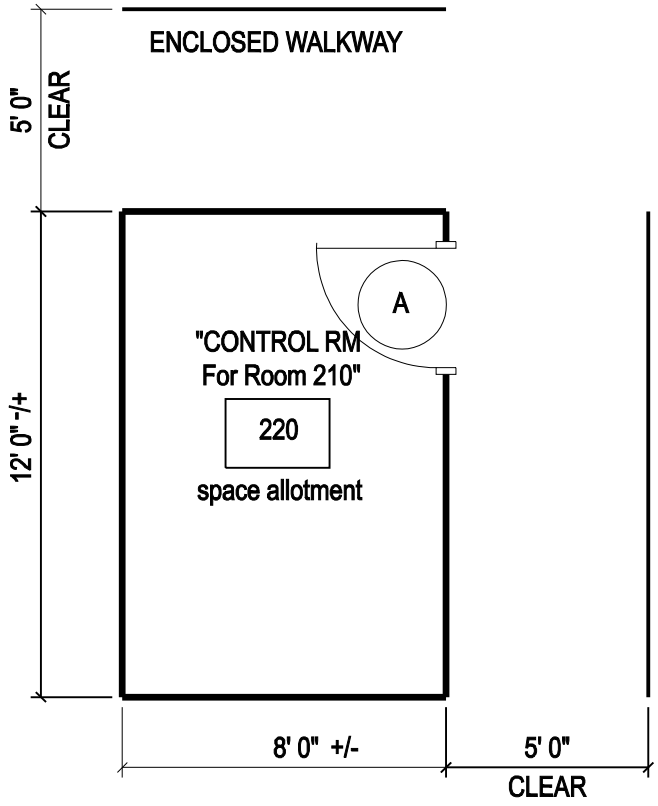


Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

CONTROL ROOM

4' 3' 2' 1' 0' 5' 10' 15'

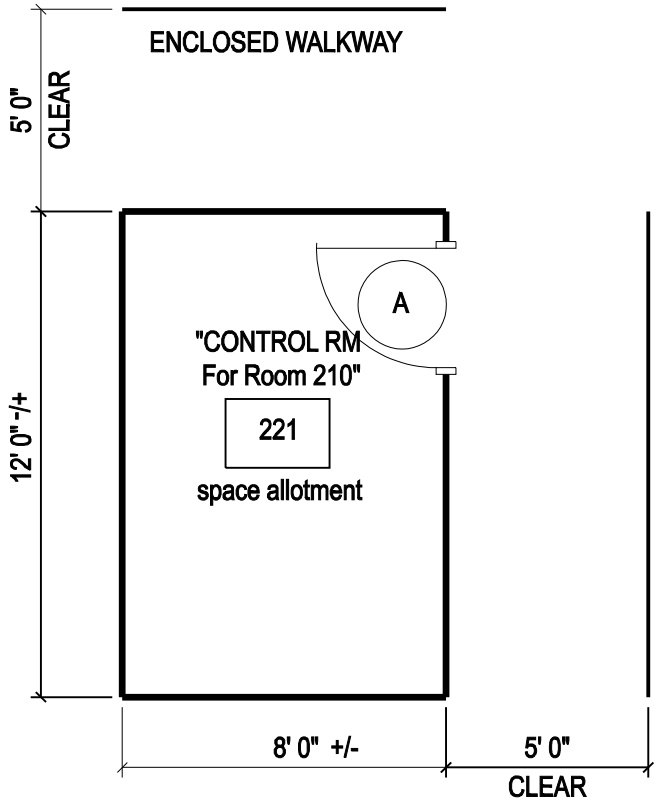


Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

CONTROL ROOM

4' 3' 2' 1' 0' 5' 10' 15'

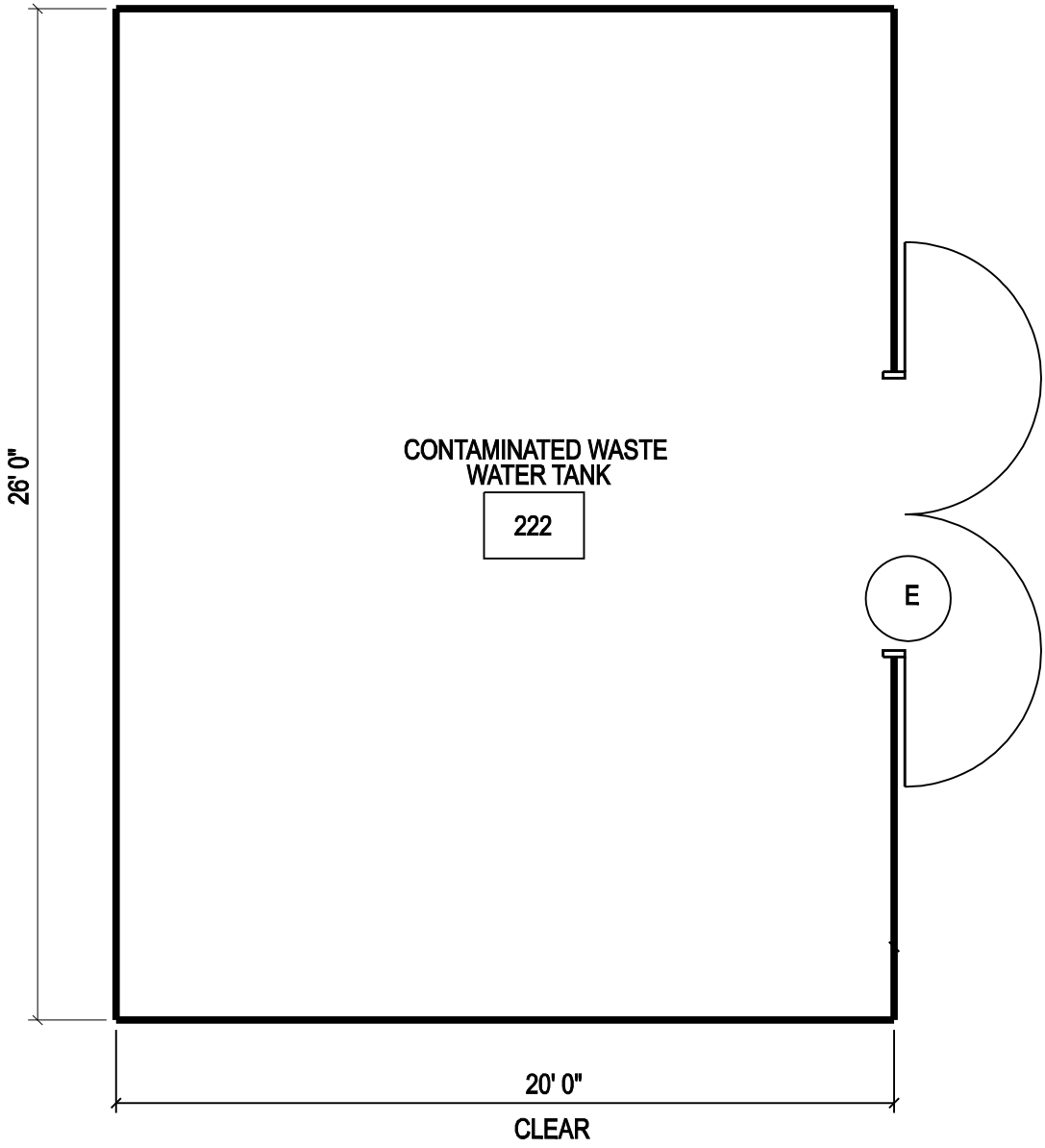


Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

CONTROL ROOM

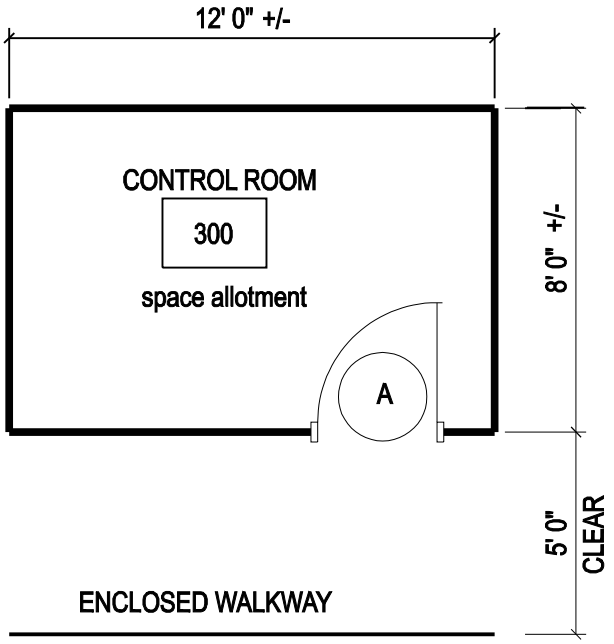
4' 3' 2' 1' 0' 5' 10' 15'



CONTAMINATED WASTE WATER TANK

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



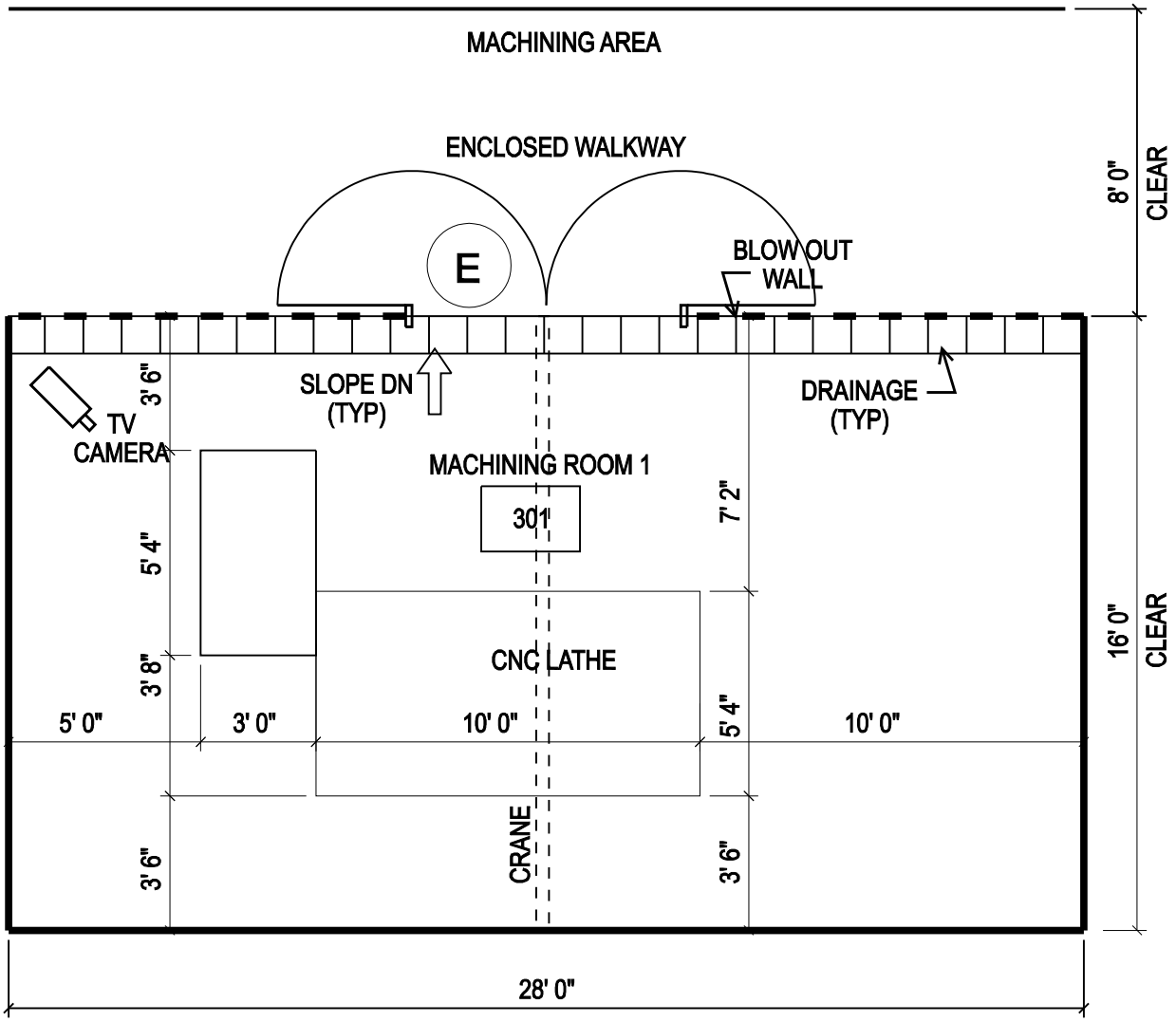
PROCESSING AREA

Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
-EQUIPMENT
-TV CAMERAS
-WORKBENCHES

CONTROL ROOM

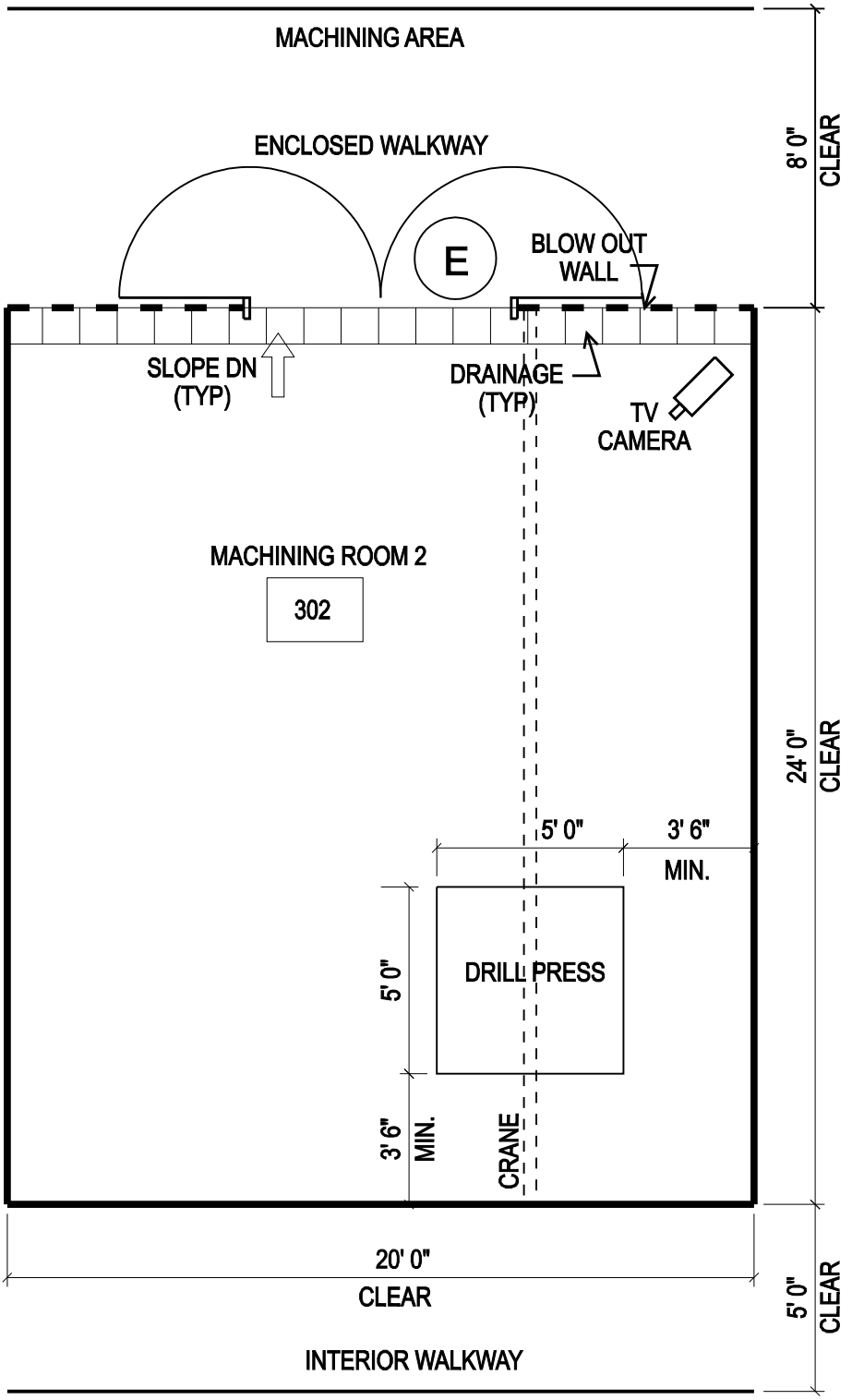
4' 3' 2' 1' 0' 5' 10' 15'



TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

CNC LATHE

4' 3' 2' 1' 0' 5' 10' 15'

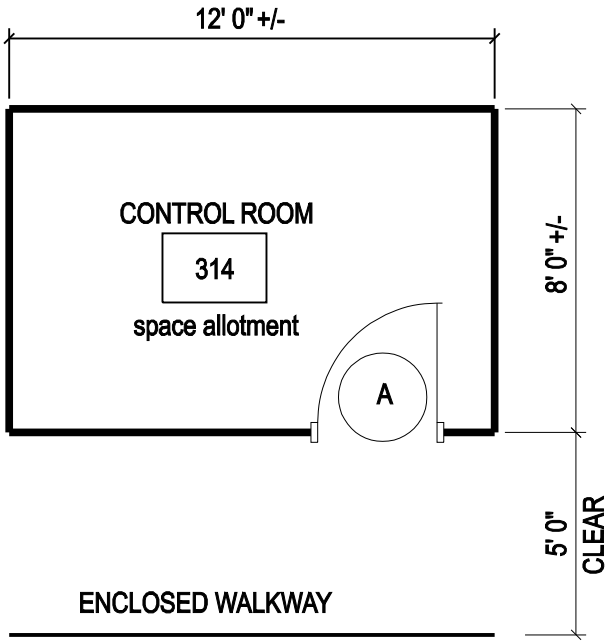


TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

DRILL PRESS SHOP

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY



PROCESSING AREA

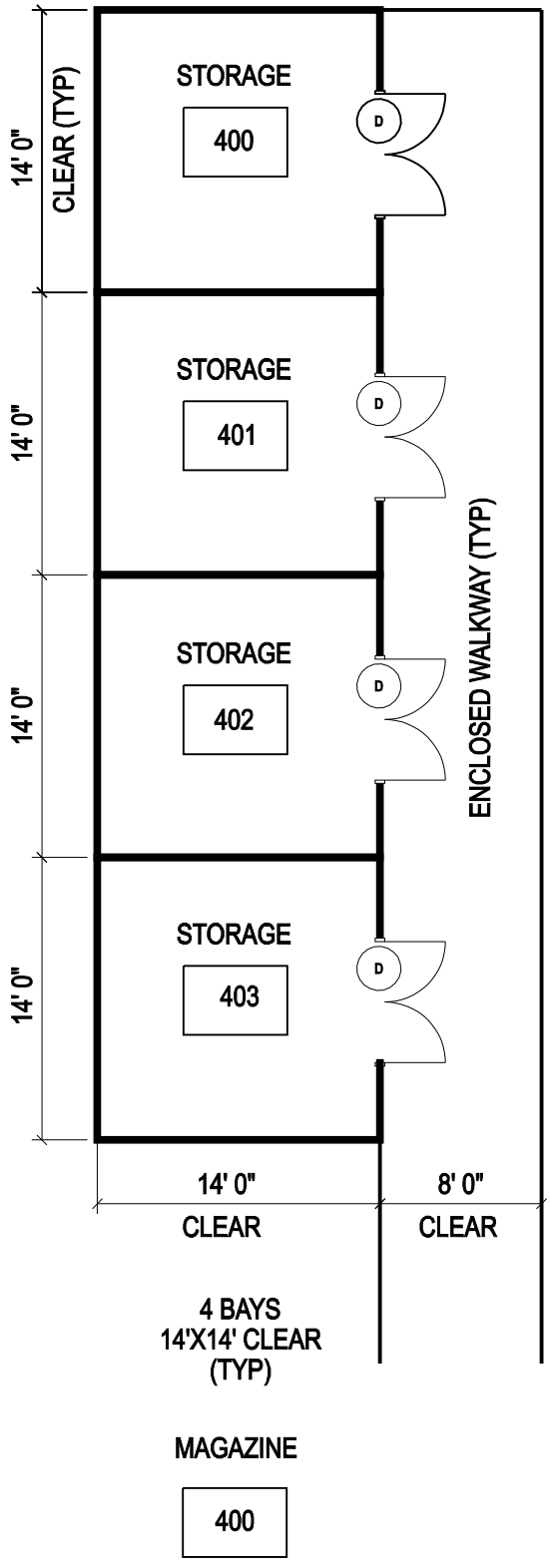
Equipment layout shall comply with the manufacturer's recommended clearances and required code clearances

TO BE FURNISHED BY OTHERS:
- EQUIPMENT
- TV CAMERAS
- WORKBENCHES

CONTROL ROOM

4' 3' 2' 1' 0' 5' 10' 15'

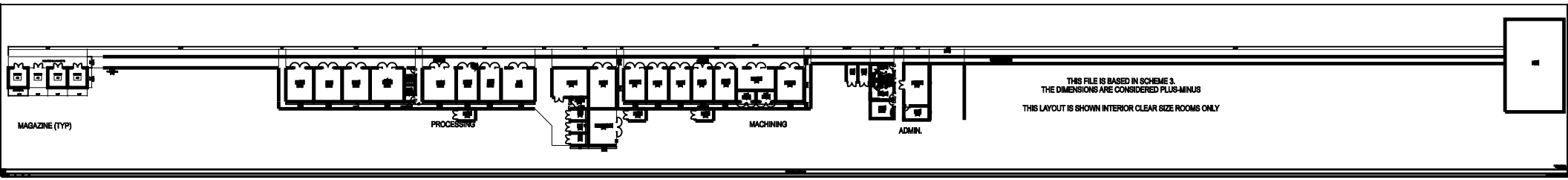
EXPLOSIVE R&D LOADING FACILITY



MAGAZINE (TYP)

4' 3' 2' 1' 0' 5' 10' 15'

EXPLOSIVE R&D LOADING FACILITY


MAGAZINE (TYP)
PROCESSING
MACHINING
ADMIN.
THIS FILE IS BASED IN SCHEME 3.
THE DIMENSIONS ARE CONSIDERED PLUS-MINUS
THIS LAYOUT IS SHOWN INTERIOR CLEAR SIZE ROOMS ONLY

ELECTRICAL AND COMMUNICATIONS ROOM BY ROOM REQUIREMENTS CHARTS

CHART #1	**ELECTRICAL ROOM BY ROOM REQUIREMENTS**
(SHEET 2 OF 5)	(POWER, LIGHTING, AND NEC HAZARD)
CHART #2	**ELECTRICAL ROOM BY ROOM REQUIREMENTS**
(SHEET 4 OF 5)	(CONDUCTIVE FLOORING, GROUND BARS, HAZARD WARNING, EMPTY CONDUITS, BACK-UP POWER)
CHART #3	**COMMUNICATION ROOM BY ROOM REQUIREMENTS**
(SHEET 5 OF 5)	(PHONE, REMOTE CAMERA, PUBLIC ADDRESS)

GENERAL NOTE: Contractor shall supply power for all equipment installed in the building, including associated control circuits power, even if not indicated on the following charts. Upon award of contract, Contractor shall field verify electrical requirements of all Government Furnished Equipment (GFE) noted elsewhere in this RFP document with the User via the Contracting Officer prior to the first design submittal.

ELECTRICAL ROOM BY ROOM REQUIREMENTS (CHART #1)

(SEE EQUIPMENT, POWER, LIGHTING, AND NEC NOTES FOLLOWING CHART)		POWER		LIGHTING			NEC Hazard
		EQUIPMENT	120V RECPS	Fixture Type	Design FC	Control	
	ADMINISTRATION						
ROOM #	**SPACE**						
100	LOBBY		P1	L1	20	L7	NEC-1
101	OPEN PLAN FOR OFFICES		P1	L2	50	L7	NEC-1
102	BREAK ROOM		P1	L1	30	L7	NEC-1
103	CONFERENCE ROOM		P1	L2	50	L7	NEC-1
104	MEN'S RESTROOMS		P3	L8	20	L10	NEC-1
105	WOMEN'S RESTROOMS		P3	L8	20	L10	NEC-1
106	JANITORS CLOSET			L4	20	L7	NEC-1
107	ELECTRICAL		P1	L4	20	L7	NEC-1
108	COMMUNICATIONS		P5	L1	30	L7	NEC-1
	PROCESSING						
	ENCLOSED WALKWAY		P1	L3	20	L7	NEC-1
200	WASHING & DRYING	E20,E21	P1	L1	50	L7	NEC-1
201	MECHANICAL ROOM		P1	L4	20	L7	NEC-1
202	FIRE SPRINKLER		P1	L4	20	L7	NEC-1
203	ELECTRICAL		P1	L4	20	L7	NEC-1
204	COMMUNICATIONS		P5	L1	30	L7	NEC-1
205	NOT USED						
206	MELT POUR	E1, E2	P2,P6	L5, L6	50	L9	NEC-2
207	DRYING OVEN	E4	P2,P6	L5	50	L9	NEC-2
208	FORMULATION STILLS	E5, E6	P2,P6	L5	50	L9	NEC-2
209	DRYING OVEN	E7	P2,P6	L5	50	L9	NEC-2
210	BP MIXER	E8	P2,P6	L5	50	L9	NEC-2
211	ROTARY PRESS	E10	P2,P6	L5	50	L9	NEC-2
212	X-RAY	E11	P2,P6	L5	50	L9	NEC-2
213	TEHNEY OVEN	E12	P2,P6	L5	50	L9	NEC-2
214	ASSEMBLY		P2,P6	L5	50	L9	NEC-2
215	GRUENBERG OVEN ROOM 1	E13, E14	P2,P6	L5	50	L9	NEC-2
215A	UTILITY ROOM	E23,E24	P1	L4	20	L7	NEC-1
216	INSPECTION		P2,P6	L5	50	L9	NEC-2
217	GRUENBERG OVEN ROOM 2	E15, E16	P2,P6	L5	50	L9	NEC-2
218	SHOP ROOM		P2,P6	L5	50	L9	NEC-2
219	CONDITIONING OVEN	E17	P2,P6	L5	50	L9	NEC-2
219A	UTILITY ROOM	E22	P1	L4	20	L7	NEC-1
220	CONTROL ROOM FOR RM 211		P4		50	L7	NEC-1
221	CONTROL ROOM FOR RM 210		P4		50	L7	NEC-1
222	CONTAMINATED WASTEWATER TANK			L5	20	L9	NEC-2
	MACHINING						
	ENCLOSED WALKWAY		P1	L3	20	L7	NEC-1
300	CONTROL ROOM		P4		50	L7	NEC-1
301	MACHINE ROOM 1	E18	P2	L5	50	L9	NEC-2
302	MACHINE ROOM 2	E19	P2	L5	50	L9	NEC-2
303-313	NOT USED						
314	CONTROL ROOM		P4		50	L7	NEC-1
	MAGAZINE						
	ENCLOSED WALKWAY			L3	20	L7	NEC-1
400	STORAGE			L5	20	L9	NEC-2
401	STORAGE			L5	20	L9	NEC-2
402	STORAGE			L5	20	L9	NEC-2
403	STORAGE			L5	20	L9	NEC-2

(SEE EQUIPMENT, POWER, LIGHTING, AND NEC NOTES FOLLOWING CHART) E = EQUIPMENT NOTE, P = POWER NOTE, L = LIGHTING NOTE, NEC = NEC HAZARD NOTE

	EQUIPMENT NOTES
E1	Provide power for Oven and associated controls per manufacturer's recomendations.
E2	Provide power for the Two Kettles and associated controls per manufacturer's recomendations.
E4	Provide power for Drying Oven.
E5	Provide power for Holston Still, and Vent Hood, and associated controls per manufacturer's recomendations.
E6	Provide power for Holston Still, and Vent Hood, and associated controls per manufacturer's recomendations.
E7	Provide power for Drying Oven.
E8	Provide power for BP Mixer.
E10	Provide power for Oven.
E11	Provide power for XRAY Machine.
E12	Provide power for Tenney Oven and associated controls per manufacturer's recomendations. (230V, 3-phase,
E13	Provide power for Gruenberg Ovenand associated controls per manufacturer's recomendations. (208V, 3-phase,
E14	Provide power for Gruenberg Oven and associated controls per manufacturer's recomendations. (208V, 3-phase,
E15	Provide power for Gruenberg Oven and associated controls per manufacturer's recomendations. (208V, 3-phase,
E16	Provide power for Gruenberg Oven and associated controls per manufacturer's recomendations. (208V, 3-phase,
E17	Provide power Conditioning Oven.
E18	Provide power for CNC Lathe (230v, 7-1/2HP).
E19	Provide power for Drill Press.
E20	Provide power for Washing Machine.
E21	Provide power for Clothes Dryer.
E22	Provide power for external oil heater serving curing oven in room 219.
E23	Provide power for external cooling unit serving one Gruenberg Oven in room 215.
E24	Provide power for external air compressor serving ovens. (30 HP, 480V, 3PH w/ on board dryer @ 120V, 20A)
	POWER NOTES
P1	Provide 120v convenience receptacles. Receptacles shall be installed so that no point measured horizontally along the floor line in any wall space is more than 6 feet from a receptacle outlet.
P2	Provide a minimum of (4) explosionproof 120v GFCI receptacles on 1 circuit. Location of receptacles shall be coordinated with the Contracting Officer Representative.
P3	Provide a minimum of (3) 120v GFCI receptacles. Location of receptacles shall be coordinated with the Contracting Officer Representative.
P4	Provide a minimum of ten (10) 120v receptacles on 3 circuits. Location of receptacles shall be coordinated with the contracting officer's representative.
P5	Provide (2) 120v, single-phase 20 amp circuits serving 2 quad type receptacles for the telephone backboard. Provide a (3) 120v receptacles on one circuit on the other three walls. (One receptacle per wall.)
P6	Provide a minimum of (2) explosionproof 120v receptacles above workbench on 1 circuit. Location of receptacles shall be coordinated with the Contracting Officer Representative.
	LIGHTING NOTES
L1	Provide recessed mounted fluorescent fixtures with prismatic lens.
L2	Provide recessed mounted fluorescent fixtures with parabolic lens.
L3	Provide pendant mounted compact fluorescent industrial dome weatherproof fixtures.
L4	Provide pendant mounted industrial fluorescent fixtures.
L5	Provide pendant mounted explosion proof industrial fluorescent fixtures.
L6	Provide supplementary pendant mounted explosion proof industrial directional fixtures aimed at kettles.
L7	Lighting to be controlled by one wall switch at each door.
L8	Provide surface mounted fluorescent fixtures. (Gasketed for moisture protection.)
L9	Lighting to be controlled by one explosionproof rated wall switch at each door.
L10	Lighting in the restrooms shall be controlled by motion sensors.
	NEC HAZARD NOTES
NEC-1	Room is a non-hazardous area.
NEC-2	All equipment installed in this room shall be rated for Class 1 and Class 2, Division 1 Area and meet the requirements of DA PAM 385-64 Ammunition and Explosives Safety Standards.

ELECTRICAL ROOM BY ROOM REQUIREMENTS (CHART #2)

(SEE MISCELLANEOUS NOTES FOLLOWING CHART)		MISCELLANEOUS					
		Conductive Flooring	Ground Bars	Hazard Warning	Empty Conduits	BACK-UP POWER	
	ADMINISTRATION						
ROOM #	**SPACE**						
100	LOBBY						
101	OPEN PLAN FOR OFFICES						
102	BREAK ROOM						
103	CONFERENCE ROOM						
104	MEN'S RESTROOMS						
105	WOMEN'S RESTROOMS						
106	JANITORS CLOSET						
107	ELECTRICAL						
108	COMMUNICATIONS						
	PROCESSING						
	ENCLOSED WALKWAY						
200	WASHING & DRYING						
201	MECHANICAL ROOM						
202	FIRE SPRINKLER						
203	ELECTRICAL						
204	COMMUNICATIONS						
205	NOT USED						
206	MELT POUR	M1	M2	M3			
207	DRYING OVEN	M1	M2	M3		M5	
208	FORMULATION STILLS	M1	M2	M3			
209	DRYING OVEN	M1	M2	M3		M5	
210	BP MIXER	M1	M2	M3	M4		
211	ROTARY PRESS	M1	M2	M3	M4		
212	X-RAY	M1	M2	M3			
213	TEHNEY OVEN	M1	M2	M3		M5	
214	ASSEMBLY	M1	M2	M3			
215	GRUENBERG OVEN ROOM 1	M1	M2	M3		M5	
215A	UTILITY ROOM						
216	INSPECTION	M1	M2	M3			
217	GRUENBERG OVEN ROOM 2	M1	M2	M3		M5	
218	SHOP ROOM						
219	CONDITIONING OVEN	M1	M2	M3		M5	
219A	UTILITY ROOM						
220	CONTROL ROOM			M3			
221	CONTROL ROOM			M3			
222	CONTAMINATED WASTEWATER TANK						
	MACHINING						
	ENCLOSED WALKWAY						
300	CONTROL ROOM			M3			
301	MACHINE ROOM 1				M4		
302	MACHINE ROOM 2				M4		
303-313	NOT USED						
314	CONTROL ROOM			M3			
	MAGAZINE						
	ENCLOSED WALKWAY						
400	STORAGE						
401	STORAGE						
402	STORAGE						
403	STORAGE						

MISCELLANEOUS NOTES

M1	PROVIDE CONDUCTIVE FLOORING.
M2	PROVIDE GROUND BARS.
M3	PROVIDE CONTROL SWITCH FOR HAZARD WARNING LIGHT SYSTEM.
M4	PROVIDE TWO (2) 2" CONDUITS WITH PULL WIRES FROM THIS ROOM TO ASSOCIATED CONTROL ROOM. CONDUIT END POINTS SHALL BE COORDINATED WITH THE CONTRACTING OFFICER'S
M5	PROVIDE BACK-UP POWER VIA GENERATOR FOR PROCESSING EQUIPMENT AND LIGHTS IN THIS ROOM.

COMMUNICATIONS ROOM BY ROOM REQUIREMENTS (CHART #3)

(SEE COMMUNICATIONS NOTES FOLLOWING CHART)		COMMUNICATIONS					
		PHONE	Remote Camera	PUBLIC ADDRESS			
	ADMINISTRATION						
ROOM #	**SPACE**						
100	LOBBY						
101	OPEN PLAN FOR OFFICES	C1,C5		C8			
102	BREAK ROOM	C1		C8			
103	CONFERENCE ROOM	C3		C8			
104	MEN'S RESTROOMS			C8			
105	WOMEN'S RESTROOMS			C8			
106	JANITORS CLOSET						
107	ELECTRICAL			C8			
108	COMMUNICATIONS			C8			
	PROCESSING						
	ENCLOSED WALKWAY	C6		C8			
200	WASHING & DRYING			C8			
201	MECHANICAL ROOM			C8			
202	FIRE SPRINKLER			C8			
203	ELECTRICAL			C8			
204	COMMUNICATIONS			C8			
205	NOT USED						
206	MELT POUR	C2		C8			
207	DRYING OVEN			C8			
208	FORMULATION STILLS			C8			
209	DRYING OVEN (FUTURE USE)			C8			
210	BP MIXER		C4	C8			
211	INERT CASTING		C4	C8			
212	X-RAY FUTURE USE			C8			
213	TEHNEY OVEN			C8			
214	ASSEMBLY			C8			
215	GRUENBERG OVEN ROOM 1			C8			
216	INSPECTION			C8			
217	GRUENBERG OVEN ROOM 2			C8			
218	SHOP ROOM			C8			
219	CONDITIONING OVEN			C8			
220	CONTROL ROOM	C1		C8			
221	CONTROL ROOM	C1		C8			
222	CONTAMINATED WASTEWATER TANK						
	MACHINING						
	ENCLOSED WALKWAY	C6		C8			
300	CONTROL ROOM	C1		C8			
301	MACHINE ROOM 1		C4	C8			
302	MACHINE ROOM 2		C4	C8			
303-313	NOT USED						
314	CONTROL ROOM	C1		C8			
	MAGAZINE						
	ENCLOSED WALKWAY	C6,C7		C8			
400	STORAGE			C8			
401	STORAGE			C8			
402	STORAGE			C8			
403	STORAGE			C8			

	COMMUNICATION NOTES
C1	PROVIDE DUAL DATA RJ-45 OUTLETS CATEGORY 6 ON EACH WALL OF ROOM.
C2	PROVIDE WALL-MOUNTED EXPLOSION PROOF PHONE OUTLET ON BLOW OUT WALL ON THE LEFT SIDE OF THE DOORS AT ENTRANCE TO ROOM.
C3	PROVIDE DUAL DATA RJ-45 OUTLETS CATEGORY 6 ON EACH WALL OF CONFERENCE ROOM.
C4	PROVIDE TWO-STRAND MULTI-MODE FIBER OPTIC CABLE FOR CAMERA LOCATION 18 INCHES BELOW CEILING IN THIS ROOM, AND TERMINATE IN ASSOCIATED CONTROL ROOM.
C5	PROVIDE DUAL DATA RJ-45 OUTLETS CATEGORY 6 FOR EACH WORSTATION IN SYSTEMS FURNITURE.
C6	PROVIDE WALL-MOUNTED PHONES PER PART 8 OF SOW.
C7	PROVIDE WALL-MOUNTED PHONE OUTSIDE MAGAZINE PER PART 8 OF SOW.
C8	PROVIDE PUBLIC ADDRESS SPEAKER COVERAGE IN THIS SPACE PER PART 8 OF SOW.

MECHANICAL ROOM BY ROOM REQUIREMENTS

PROCESSING

ROOM #	SPACE	EQUIPMENT	HOIST (Note 1)	DRAIN TO SANITARY	DRAIN TO CONTAMINATED WASTE SYSTEM	EYEWASH / SHOWER (Note 9)	PROCESS WATER	COMPRESSED AIR (120 PSI)	STEAM CLEANING STATION	PROCESS STEAM TAPS (15 PSI)	VACUUM	HEAT EXCHANGER (STEAM TO HOT WATER)	SPRINKLER CLASSIFICATION	DELUGE SPRINKLER	MISC
	ENCLOSED WALKWAY WITH WEATHER PANELS														
	LOADING DOCK														
200	WASHING & DRYING			spare 4" San. connection	Floor Drain, Washer Drain Washer 2nd Containment Drain, Janitors Sink Drain				1				Ordinary Haz 1		Note 7
201	MECHANICAL ROOM			Floor Drains			1	1					Ordinary Haz 2		
202	FIRE SPRINKLER			Floor Drains				1					Light Hazard		
203	ELECTRICAL			Floor Drains									Light Hazard		
204	COMMUNICATIONS			Floor Drains									Light Hazard		
205	NOT USED														
206	MELT/POUR	General for room	1/2 Ton		Trench Drain	1	1	2	2				Extra Hazard 2		
		Conditioning Oven (GFE - Note 8)						2		1@15psi		500,000 btu/hr, 220F water supply		Yes	Note 10
		Heating Kettle (GFE)						2		3@15psi 3@10psi	1	150,000 btu/hr, 220F water supply		Yes	Note 10
		Heating Kettle (GFE)						2		3@15psi 3@10psi	1	150,000 btu/hr, 220F water supply		Yes	Note 10
207	DRYING OVEN	General for room			Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
		Drying Oven #1 (GFE)										150,000 btu/hr, 150F water supply		Yes	Note 10
207A	UTILITY	General for room											Light Hazard		Note 12
208	HOLSTEN STILLS	General for room			Trench Drain	1	1	2	1		2		Extra Hazard 2		
		Hostein Still (GFE)						1		1@10psi		150,000 btu/hr, 212F water supply		Yes	Note 3, Note 10
		2nd Still (future)						1		1@10psi		150,000 btu/hr, 212F water supply		Yes	Note 4, Note 10
209	CURING OVEN	General for room			Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
		Oven (GFE)										150,000 btu/hr, 150F water supply		Yes	Note 10
210	BP MIXER	General for room	1 Ton		Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
		APV Vertical Mixer (GFE)										150,000 btu/hr, 200F water supply		Yes	Note 10
211	ROTARY PRESS	General for room			Trench Drain	1	1	2	1	1@15psi	2	150,000 btu/hr, 220F water supply	Extra Hazard 2		
212	X-RAY	General for room			Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
213	TENNEY OVEN	General for room			Trench Drain	1	1	1	1	1@15psi	2		Extra Hazard 2		
		Tenney Oven (GFE)						1@20-60psi , Note 11						Yes	Note 2, Note 10
214	ASSEMBLY	General for room			Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
215	GRUENBERG OVEN ROOM 1	General for room			Trench Drain	1	1	1	1	1@15psi	2		Extra Hazard 2		
		Gruenberg Oven (GFE)						1@50-100 psi, Note 11						Yes	Note 6, Note 10
		Gruenberg Oven (GFE)						1@50-100 psi, Note 11						Yes	Note 10
215A	UTILITY	General for room											Light Hazard		Note 6
216	INSPECTION	General for room			Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
217	GRUENBERG OVEN ROOM 2	General for room			Trench Drain	1	1	1	1	1@15psi	2		Extra Hazard 2		
		Gruenberg Oven (GFE)						1@50-100 psi, Note 11						Yes	Note 10
		Gruenberg Oven (GFE)						1@50-100 psi, Note 11						Yes	Note 10
218	SHOP ROOM	General for room		Floor Drains			1	2	1				Extra Hazard 2		
219	CONDITIONING OVEN	General for room			Trench Drain	1	1	2	1	1@15psi	2		Extra Hazard 2		
		Curing Oven (GFE)												Yes	Note 5
219A	UTILITY	General for room											Ordinary Haz 2		Note 5
220	CONTROL ROOM (for Room 211)							2					Light Hazard		
221	CONTROL ROOM (for Room 210)							2					Light Hazard		
222	CONTAMINATED WASTE WATER TANK						1	1	1				Extra Hazard 2		

MECHANICAL ROOM BY ROOM REQUIREMENTS

ADMINISTRATION

ROOM #	SPACE			DRAIN TO SANITARY	Domestic Hot Water	Domestic Cold Water							SPRINKLER CLASSIFICATION		MISC
	ENCLOSED WALKWAY WITH WEATHER PANELS														
100	LOBBY												Light Hazard		
101	OPEN PLAN FOR OFFICES												Light Hazard		
102	BREAK ROOM			Sink	Sink	Sink							Light Hazard		
103	CONFERENCE ROOM												Light Hazard		
104	MEN'S RESTROOM			Floor Drains, Sinks, Toilets, Shower	Sinks , Shower	Sinks, Toilets, Shower							Light Hazard		
105	WOMEN'S RESTROOM			Floor Drains, Sinks, Toilets, Shower, Water Fountain	Sinks , Shower	Sinks, Toilets, Shower, Water Fountain (outside restrooms)							Light Hazard		
106	JANITORS CLOSET			Floor Drain, Janitors Sink	Janitors Sink	Janitors Sink							Light Hazard		
107	ELECTRICAL												Light Hazard		
108	COMMUNICATIONS												Light Hazard		

MACHINING

ROOM #	SPACE	EQUIPMENT	HOIST (Note 1)	DRAIN TO SANITARY	DRAIN TO CONTAMINATED WASTE SYSTEM	EYEWASH / SHOWER (Note 9)	PROCESS WATER	COMPRESSED AIR (120 PSI)	STEAM CLEANING STATION	PROCESS STEAM TAPS (15 PSI)	VACUUM	HEAT EXCHANGER (STEAM TO HOT WATER)	SPRINKLER CLASSIFICATION	DELUGE SPRINKLER	MISC
	INTERIOR WALKWAY			Floor Drains									Extra Hazard 2		
300	CONTROL ROOM							2					Light Hazard		
301	MACHINING ROOM 1	CNC Lathe	1/4 TON		Trench Drain	1	1	2	1		2		Extra Hazard 2	Yes	
302	MACHINING ROOM 2	Drill Press	1/4 TON		Trench Drain	1	1	2	1		2		Extra Hazard 2	Yes	
303-313	NOT USED														
314	CONTROL ROOM							2					Light Hazard		

MAGAZINE

ROOM #	SPACE	EQUIPMENT	HOIST	DRAIN TO SANITARY	DRAIN TO CONTAMINATED WASTE SYSTEM	EYEWASH / SHOWER (Note 9)	PROCESS WATER	COMPRESSED AIR (120 PSI)	STEAM CLEANING STATION	PROCESS STEAM TAPS (15 PSI)	VACUUM	HEAT EXCHANGER (STEAM TO HOT WATER)	SPRINKLER CLASSIFICATION	DELUGE SPRINKLER	MISC
	ENCLOSED WALKWAY														
400	STORAGE														
401	STORAGE														
402	STORAGE														
403	STORAGE														

NOTES	
Note 1	Area of coverage in rooms shall be in accordance with the Architectual room sketch
Note 2	Provide two 4 inch exhaust vents to the outside for the Tenney Oven
Note 3	Provide exhaust penetration for fume hood (2345cfm). Contractor to verify required penetrationn size/configuration from existing equipment
Note 4	Provide same penetration configuration as per Note 3, but cap penetration for future equipment installation
Note 5	The curing oven in Room 219 has an external oil heater that will be located in Room 219A. Provide penetrations for the oil heating lines between the rooms (2 lines up to 4 inch diameter).
Note 6	One Gruenberg Oven in Room 215 has an external cooling unit that will be located in Room 215A. Provide penetrations for the refrigerant lines between rooms (2 lines up to 2 inch diameter)
Note 7	Domestic hot and cold water shall be provided to the clothes washer and janitors sink
Note 8	GFE = Government Furnished Equipment
Note 9	All Emergency eyewash showers shall drain to the Contaminated Waste Collection System
Note 10	The process services supporting this government furnished equipment shall be co-located on a wall near the equipment. The layout and configuration of the connections shall be submitted for approval.
Note 11	Compressed air for these supply points shall be provided from the dedicated Oven Compressed Air System
Note 12	Drying Oven in Room 207 has an external oil heater to be located in Room 207A. Provide penetrations for connecting the oil heating lines between rooms. (2 lines up to 4 inch diameter)

ENVIRONMENTAL ASSESSMENT
for the
PICATINNY ARSENAL
EXPLOSIVES RESEARCH AND DEVELOPMENT
LOADING FACILITY

Prepared for

U.S. Army Tank-Automotive Armament Command
Armament Research, Development and Engineering Center
Picatinny Arsenal
Dover, New Jersey

Prepared by

ENVIRONMENTAL COMPLIANCE, INC.

and

FOSTER WHEELER ENVIRONMENTAL CORPORATION

July 2002

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LIST OF ACRONYMS AND ABBREVIATIONS

ARDEC	Armament Research, Development and Engineering Center
CAA	Clean Air Act
EWD	Explosives and Warheads Division
DOD	Department of Defense
ICUZ	Installation Compatible Use Zone
NAAQS	National Ambient Air Quality Standards
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NJAC	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
PEM	Palustrine Emergent Wetland
PFO1	Palustrine Forested, Broad Leaved Deciduous Wetland
PSS	Palustrine Scrub/Shrub Wetland
SESCP	Soil Erosion and Sediment Control Plan
SHPO	State Historic Preservation Office
TACOM	Tank-Automotive Armaments Command
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WMA	Watershed Management Area

1.0 PURPOSE AND NEED FOR THE PROPOSED ACTION

The U.S. Army Tank-Automotive Armaments Command - Armament Research, Development, and Engineering Center (TACOM-ARDEC) is located at the Picatinny Arsenal (Arsenal) in Morris County, New Jersey. The mission of the Center is the development of an armament, munitions, and chemical technology base along with modern smart weapon systems. Highly skilled engineers and scientists, as well as other military personnel comprise the work force. The Arsenal's Explosives and Warheads Division (EWD) supports the only Army owned and operated facilities for energetic materials. Their mission is to lead the Army in the research and development of new explosives and to maintain cutting edge technology for anti-armor warheads.

The Army has proposed the construction of a new explosives facility at Picatinny Arsenal (Figure 1-1). The proposed facility will consolidate an operation that is currently spread over 25 old and decrepit buildings. The construction of a new explosives facility is required to modernize and centralize research and development operations of new and improved energetic materials for warhead, tank, artillery, cannon caliber, and small arms.

The existing 25 buildings that currently comprise the explosives facility are spread over a one-mile area. With many of the buildings being as old as 60 years, they are substandard in modern safety, environmental, fire protection, and process controls. These facilities are marginally functioning with deteriorated plumbing, electricity, and physical structures. Major deficiencies in the existing buildings include: redundant heating/cooling systems, vacuum systems, and non-contact cooling water systems; limited overnight explosive magazine storage; inadequate temperature and humidity controls, plumbing, electricity, and lighting; and, leaking roofs on all buildings.

The issuance of repair orders and other administrative work associated with the constant repairs of the outdated explosives facilities, as well as down time during repairs, are preventing the EWD from efficiently performing its mission for the Army. If the proposed explosives facility is not constructed, the ability of the EWD to perform its duties will be severely hindered. Under the current conditions, the EWD cannot use their resources effectively or concentrate their efforts on developing, evaluating, and improving explosive formulations that are both cost-effective and environmentally friendly. In addition, increasingly stringent safety and environmental regulations could also impede the research and development of new explosive formulations at its existing location.

The EWD is in dire need of a modern facility for press loading, experimental cast loading, precision machining, and scale up of new high explosive formulations. This project would provide EWD with an integrated and centralized facility for a substantial operating and maintenance cost savings to the Government.

Figure 1-1

2.0 DESCRIPTION OF THE PROPOSED ACTION

The proposed action calls for the demolition of 25 widely scattered facilities that are currently used by the EWD. The existing facilities, most of which are 60 years old, will be replaced by a new, modernized facility that will centrally locate the explosives operations and meet current safety, accessibility, and construction standards. The new facility, as proposed, will include high bay areas, testing bays, storage areas, office areas, and ammunition storage magazines. The new facility will be enclosed with barricades on both sides. This facility will also include underground hot- and cold-water recirculators, a compressed air system, and a vacuum pump system. Explosion proof lighting, conducting flooring, and lightning protection system will be provided. Supporting facilities will include utilities; electrical service; sewer; storm drainage; paving, walks, curbs, and gutters; information systems; and site improvements. Heating, air conditioning, and access for the handicapped will be provided. New parking areas will also be constructed as part of the proposed action.

Three locations for the explosives facility were considered. Each of the sites is located in the west-central portion of the Arsenal (Figure 2-1).

Utilities will be extended to the new explosives facility from existing lines. Potable water lines will be provided for the proposed facility by the installation's water supply system, and sewage generated will be discharged to the Rockaway Valley Regional Sewerage Authority through the installation's pre-treatment plant.

Demolition of the existing explosives facility will occur following the completion of the new facility. Twenty-five buildings will be demolished for construction of the new explosives facility (Table 2-1). The existing 50+ year old structures are constructed of hollow clay tiles with corrugated transite asbestos roofs. Lead-based paint may exist in some of the structures. Most of the buildings are contaminated with energetics and will be manually demolished. Structures not explosively contaminated will be burned. Asbestos and materials contaminated with lead-based paint will be disposed of accordingly.

Figure 2-1, Site Plan Map

Table 2-1
Existing Explosives Research and Development Loading Facility
Buildings to be Demolished

Building Number	Description
209	Storage Building
210	Fuze Assembly
213	Storage Building
214	Chang House
215	Ordnance Facility
216	Office
221	Sensitivity Test Laboratory
221A	Inert Storage
224	Control Room
225	Explosives Machining
230	Explosives Workshop
230A	Magazine Storage
230B	Magazine Storage
230F	Inert Storage
230G	Motor Room
232	Explosives Loading
232A	Unknown
232C	Unknown
232F	Motor Room
234	Ovens
235	Assembly and Packing
238	Pressing
252A	Flammable Material Handing
252C	Explosives Fabrication
408	Condemned Building

3.0 APPROPRIATE AND REASONABLE ALTERNATIVES CONSIDERED

The proposed action is to construct a new, state-of-the-art explosives facility at Site #1. Site #1 comprises approximately 40,000 square feet and measures approximately 400 feet long by 100 feet wide. The site includes approximately 6,912 square feet of paved area (Phipps Road and an unnamed road that connects Phipps Road to 5th Avenue). Approximately half of the unpaved portion of the site is covered with gravel and the remaining half consists of previously disturbed, open area vegetated with early successional vegetation and a few scattered trees.

This selection was made on the basis that the existing explosives facility is widely distributed and associated structures have deteriorated over the years to a point where it is not economical to repair them. The Arsenal considered three locations for the new facility, as described below and shown on Figure 2-1. The site location proposed by the Arsenal was selected because it consists of disturbed land with portions that have previously been developed. Construction of the facility at this location will limit potential adverse environmental impacts.

The following alternatives for the proposed action have been considered:

- Site #2
- Site #3
- No Action

These alternatives are discussed below:

Alternative 1: "Site #2"

Site #2 is located to the northeast of Site #1 and encompasses approximately 22,750 square feet (approximately 65 feet wide by 350 feet long). Phipps Road marks the site boundary to the northwest, while a second road, 5th Avenue, marks the southeast boundary. A steam line runs along the northeast boundary, and vacant land lies to the southwest. Early successional vegetation and scattered trees occupy this undeveloped site. The only structures present on this site include one valve and a fire hydrant.

Alternative 2: "Site #3"

Further to the northeast is the location proposed as Site #3. This site measures approximately 180 feet long by 100 feet wide. Buildings 221 and 221A are present on the site and will be demolished prior to the proposed construction. Additional structures on the site include four 12–foot high concrete columns, approximately 8 feet apart, supporting a steam line. The steam line bisects the site from the northeast to the southwest along the southeastern boundary. The remaining land associated with Site #3 consists of disturbed woodlands, a partially maintained lawn, and forestland.

Alternative 3: "No Action"

The "No Action" alternative would maintain the existing explosives facility at its existing size and location. This alternative was considered, but has been deemed not to meet the prescribed need of the proposed action due to the current deteriorated state and widespread distribution of the existing structures. Present conditions of the structures endanger the safety of the personnel who occupy them. Additionally, the distribution of the facility's structures reduces the efficiency of the mission.

4.0 AFFECTED ENVIRONMENT

This section presents a general description of Picatinny Arsenal and the resources that could potentially be affected by construction of a new explosives facility. The information contained in this section was primarily derived from Burt (2000). Additional details on these and other aspects of the environment at Picatinny can be found in that document. A reconnaissance level site visit was conducted on October 16 and 17, 2001 by Foster Wheeler Environmental Corporation. Information obtained during that visit is also included in the following sections.

4.1 Location and Land Use

Picatinny Arsenal occupies 6,491 acres of ridge and valley terrain in Morris County, New Jersey. The Arsenal is located 32 miles northwest of Newark and 42 miles west of New York City. The Delaware Water Gap is located 45 miles to the west. Surrounding communities include Wharton Borough (approximately 1 mile south of the Arsenal), Dover (approximately 3 miles south of the Arsenal), Denville Township, Rockaway Township, and Rockaway Borough (approximately 5 miles southeast of the Arsenal). According to the State of New Jersey, Department of Labor (2001), the populations of these communities in 1999 were 5,695, 16,006, 15,846, 22,009, and 6,316, respectively.

The United States Army Armament Research, Development and Engineering Center (ARDEC), located at Picatinny Arsenal, is a major research and development center under the U.S. Army Materiel Command. Functions operating at the Arsenal include research laboratories and test ranges. These functions are directly related to fulfillment of the installation's mission. One of the Arsenal's first missions was the development of pyrotechnic signals and flares. Other operations, including water treatment, housing, power plant, maintenance, and community and recreation facilities, exist to support that mission.

Large areas of the Arsenal are covered with forests (3,793 acres) and wetlands (approximately 1,250 acres). Due to the steep and rocky terrain of the ridges, development has occurred on the valley floor and on several plateaus. These developed plateaus are surrounded by essentially natural habitats.

The three alternative site locations considered for the new explosives facility all lie within the west-central portion of the Arsenal (Figure 2-1). A description of each of these sites is provided below.

4.1.1 Site #1 (Proposed Action)

Site #1 is located between Buildings 210 and 214 and includes a portion of Phipps Road. The site is bound by Building 210 to the northwest, an unnamed road that connects Phipps Road to 5th Avenue to the southwest, Building 214 and vacant land to the southeast and vacant land to the northeast. Approximately 40,000 square feet (400 feet long by 100 feet wide) of previously disturbed land comprises this site. Phipps Road and an unnamed road that connects Phipps Road to 5th Avenue account for approximately 6,912 square feet of paved area. An estimated 50% of the unpaved portion of the site is covered with gravel, while the remaining 50% consists of open area vegetated with early successional vegetation and a few scattered trees. Structures

observed on the site during the October 16 and 17, 2001 site reconnaissance include a ventilation system for Building 210 (approximately 20 feet by 22 feet), a monitoring well, five valves (6-inch steel pipe), a capped 4-inch steel pipe, an uncapped 6-inch pipe, and a locked metal box (3 feet by 4.5 feet). One manhole was observed on the site within Phipps Road.

4.1.2 Site #2

This site is located to the northeast of Site #1 and is bound by Phipps Road to the northwest, a steam line to the northeast, 5th Avenue to the southeast, and vacant land to the southwest. Site #2 is approximately 65 feet wide by 350 feet long and encompasses approximately 22,750 square feet. Structures present on Site #2 site include one valve and a fire hydrant. Early successional vegetation and scattered trees occupied the undeveloped site as observed during the October 16 and 17, 2001 site reconnaissance. Buildings 210E and 213 are located to the northwest of the site on the northwest side of Phipps Road.

4.1.3 Site #3

Site #3 lies to the northeast of Site #2 and measures approximately 180 feet long by 100 feet wide (about 18,000 square feet). The site is bound by forest to the northwest, forest and Building 225 to the northeast, Phipps Road to the southeast, and forest to the southwest. Buildings 221 and 221A are located within the site boundaries and will be demolished prior to the proposed construction. These structures occupy about 3,600 square feet. Additional structures on the site include four 12–foot high concrete columns, approximately 8 feet apart, supporting a steam line. The steam line bisects the site from the northeast to the southwest along the southeastern boundary. A partially maintained lawn (approximately 4,100 square feet), a disturbed wooded area (about 6,200 square feet) and forest (approximately 4,100 square feet) occupy the remaining lands associated with Site #3.

4.2 Geology and Soils

The Picatinny Arsenal area has two major geologic faults, the Green Pond Fault and the Mount Hope Fault. A longitudinal fault that runs parallel and along the trend of the western side of the valley, the Green Pond Fault, has a displacement of 1,500 feet, an uplift on the west side, and dips steeply to the northwest. The Mount Hope Fault is a high angle, strike-slip fault (horizontal movement) that runs across the valley trend (ARDEC 1996). The most recent earthquakes near the Picatinny area occurred from August 14 to November 3, 1969. The most severe of these earthquakes happened on October 6, 1969, measuring 1.25 on the Richter Scale.

Older precambrian bedrock (granitic gneiss) is present in the east and southeast portions of the Arsenal, while younger paleozoic bedrock (quartz conglomerate and sandstone) is located in the western and northwestern areas. Twenty-six soil types, derived from bedrock, glacial till, and colluvium, are present at the Arsenal. The soils are primarily coarse textured, principally sandy loams. The mountain range to the northwest has rough, stony land that formed on jagged, rocky slopes. The easterly slopes across the valley and the southern end of the mountain range contain primarily stony land and sandy clay loam soils. The soils of the central portion of Picatinny Arsenal consist of loamy, silty, sandy, and gravel clay pan soils, along with swampy areas consisting of peat and muck. Glacial till covers the western and eastern flanks of the Arsenal.

The southern end of the Arsenal consists of poorly sorted sands, gravels, and boulders bordered by a terminal moraine (ARDEC 1996).

According to the Soil Survey for Morris County, New Jersey, the three considered site locations consist of Rockaway very stony, sand loam (RrD), with 3 to 15 percent slopes. Rockaway series soils are well drained and moderately well drained upland soils that are subject to erosion. A Soil Erosion and Sediment Control Plan (SESCP) is required because of the size of the disturbed area, i.e., greater than 5,000 square feet of disturbance. The SESCP will be submitted to the Morris County Soil Conservation District for approval.

The site subsurface conditions are typical of glacial till geology. Generally, the soils on the proposed site consist of gravel, cobbles, and boulders in a silt or clay sand matrix. Groundwater readings following test borings range from 3 ¼ to 15 ¼ feet below the existing ground surface. Therefore, localized water could be encountered when excavating at the lower elevations of the site. It should be the responsibility of the construction contractor to implement appropriate mitigation measures including pumping and discharge of groundwater, springs, or perched water to enable foundation or earthwork operation. The construction contractor should also be aware that such work might require a dewatering permit.

Two monitoring wells (62MW-1 and 62MW-2) were observed on the site during the October 16 and 17, 2001 site reconnaissance. The depths of the wells are 30 feet for 62MW-1 and 31 feet for 62MW-2. The monitoring wells are equipped with ten-foot screens and were installed to measure past contamination that may have existed because of explosives manufacturing and hazardous waste storage.

4.3 Air Quality

Picatinny Arsenal is located within United States Environmental Protection Agency (USEPA) Region 2. Outdoor air quality is judged by comparing actual air pollutant amounts with the National Ambient Air Quality Standards (NAAQS) that have been established by the USEPA for six primary or “criteria” pollutants (carbon monoxide, nitrogen dioxide, ozone, lead, particulate matter with diameters of 10 micrometers or less, particulate matter with diameters of 2.5 micrometers or less, and sulfur dioxide). The State of New Jersey has established ambient air quality standards for the same pollutants covered by the NAAQS, with some variation in the primary and secondary standards for particulate matter and the secondary standards for sulfur dioxide. Primary standards define levels of air quality that are judged necessary to protect public health and secondary standards to protect public welfare.

The New Jersey Department of Environmental Protection (NJDEP) performs air pollution monitoring throughout New Jersey. Picatinny Arsenal lies in the Suburban Region, which includes Middlesex, Morris, and Somerset Counties. Monitoring stations within Morris County are located in Morristown and Chester. According to historical NJDEP air monitoring data (1985 to 2000), levels of carbon monoxide and ozone have exceeded the quality standards in Morristown and Chester, respectively (NJDEP, 2001). The 1990 amendments to the Clean Air Act (CAA) require that an agency's activities do not aggravate existing air quality violations or delay attainment status.

4.4 Surface Water

There are no surface water bodies or storm water drainage features located on the three sites considered for the new explosives facility. Green Pond Brook is listed by the Department of the Interior, Geological Survey (USGS) Topographic Map Quadrangle (7.5-minute series) for Dover, NJ (dated 1954 and photorevised in 1981), as the nearest body of water to the three considered site locations (approximately 1,750 feet to the southeast). Green Pond Brook feeds Picatinny Lake, located to the northeast of the three sites, and continues southwest from the lake where it empties into the Rockaway River. During the site reconnaissance, rivulets, not noted on the Dover USGS topographic map, were observed in Bear Swamp, located between 30 and 135 feet to the southeast of the three considered locations. One manhole was observed on Site #1 within Phipps Road and another manhole, also within Phipps Road, was observed approximately five feet to the southwest of Site #1. The manholes are associated with sewer lines.

The Arsenal is located within the Upper Passaic Watershed Management Area, known as Watershed Management Area 6 (WMA #6). WMA #6 includes the Rockaway, Whippany and upper Passaic Rivers above the confluence with the Pompton River and occupies approximately 416 square miles.

Impervious areas associated with the proposed explosives facility will include parking areas. These areas should be kept to a minimum by using the proper materials. Two types of paving materials (asphalt and sand or crushed stone) are permitted for parking surfaces at Picatinny Arsenal. Sand or crushed stone are environmentally preferable materials for parking lots as they are pervious. Stormwater drainage associated with the facility's parking areas will be tied into the existing Arsenal stormwater system.

4.5 Wetlands

Approximately 1,250 acres of wetlands are located within the boundaries of Arsenal. Wetlands were not observed on any of the three sites considered for the proposed explosives facility during the October 16 and 17, 2001 site reconnaissance. Additionally, natural and archeological resource maps prepared by the Waterways Experiment Station (U.S. Army Corps of Engineers, 1994) and the U.S. Fish and Wildlife Service, National Wetlands Inventory Map (NWI), 7.5-minute series for Dover, NJ, do not identify wetlands on any of the considered site locations.

A wetland complex (Bear Swamp), comprising palustrine forested, broad-leaved deciduous (PFO1), palustrine scrub/shrub (PSS), and palustrine emergent (PEM) components, was observed within 50 feet of Site #1 and Site #2 during the site reconnaissance (Figure 2-1). Site #3 is located approximately 135 feet northwest of the wetland complex. Dominant vegetation observed in the wetland during the site visit included red maple (*Acer rubrum*), sweet birch (*Betula lenta*), tussock sedge (*Carex stricta*), sensitive fern (*Onoclea sensibilis*), woolgrass (*Scirpus cyperinus*), and broadleaf cattail (*Typha latifolia*). The Waterways Experiment Station wetland map indicates a Red Maple wetland (USACE, 1994) and the NWI identifies a PFO1 wetland at this location. The resource value of any nearby wetlands has not been determined; therefore, it cannot be stated if any wetlands in the area are of exceptional resource value.

4.6 Floodplains

Based on the USACE's Waterways Experiment Station Draft Final Report (1994), the three considered locations for the proposed explosives facility do not lie within the annual, 100-year, or 500-year floodplains.

4.7 Flora and Fauna

4.7.1 Vegetation Resources

Approximately 67% (5,848 acres) of land at Picatinny Arsenal is forested. The upland forests include mixed oak and northern hardwood, with mixed oak being the most prevalent. Each of the three considered site locations is occupied by Mixed Oak, with Sites #1 and #2 also containing Non-Forested Lands (USACE, 1994). Vegetation types observed during the October 16 and 17, 2001 site reconnaissance include disturbed land vegetated with early successional vegetation, maintained lawn, mixed oak forest and woodlands. These vegetation types were also observed in the immediate vicinity of the sites and are typical of those found in Morris County, New Jersey. A more detailed description of vegetation observed at each site is provided below.

Site #1

The USACE's Waterways Experiment Station Draft Final Report (1994) identifies the area associated with Alternative #1 as Non-Forested Lands. During the October 2001 site reconnaissance, Site #1 was occupied by paved roads and disturbed land. Approximately 50% of the disturbed area was covered with gravel and the remaining 50% (about 16,544 square feet) was vegetated with early successional vegetation and a few scattered trees. Mature trees located on this site include four red oaks (*Quercus rubra*), two white oaks (*Quercus alba*), one sweet birch, and one red maple. Two small clusters of young trees are also present on the site, one along the southwest end of the site and the other near the ventilation system for Building 210. Tree species present within these clusters include red maple, sweet birch, quaking aspen (*Populus tremula*), eastern hemlock (*Tsuga canadensis*), white ash (*Fraxinus americana*) and American sycamore (*Platanus occidentalis*). Early successional vegetation observed included daisy fleabane (*Erigeron annuus*), common mugwort (*Artemisia vulgaris*), curled dock (*Rumex crispus*), clover (*Trifolium* sp.), goldenrod (*Solidago* sp.), common mullein (*Verbascum thapsus*), English plantain (*Plantago lanceolata*), yarrow (*Achillea millefolium*), thistle (*Cirsium* sp.), dogbane (*Apocynum cannabinum*), white vervain (*Verbena urticifolia*), butter-and-eggs (*Linaria vulgaris*), common milkweed (*Asclepias syriaca*), bluestem (*Andropogon gerardii*), and grass species.

Site #2

Site #2 is also identified as Non-Forested Lands according to the USACE's Waterways Experiment Station Draft Final Report (1994). During the October 2001 site visit, the area was occupied by early successional vegetation and scattered trees. Twenty-seven mature trees, consisting of red and white oaks, tulip trees (*Liriodendron tulipifera*), red maples, hemlocks, white ash, black oak (*Quercus velutina),* and chestnut oak (*Quercus prinus*) were present on the site, along with 16 young hemlocks. In addition to the early successional vegetation observed at Site #1, tulip tree and foxtail grass (*Alopecurus* sp.) were observed in the herbaceous layer and

Japanese barberry (*Berberis thunbergii*) and raspberry (*Rubus idaeus*) were present in the shrub strata.

Site #3

The USACE's Waterways Experiment Station Draft Final Report (1994) identifies Site #3 as Mixed Oak. Three communities were observed on the site during the October 2001 site reconnaissance: a somewhat-maintained lawn, disturbed woodlands, and forest. The approximately 4,100 square-foot lawn area is located along the site's southeastern edge between Building 221 and Building 216. The lawn area is approximately 40 feet wide and runs along Phipps Road. Queen Ann's lace, English plantain, moth mullein, common mullein, strawberry (*Fragaria virginiana*) and grass species were observed in the lawn area. The wooded area extends from the lawn area and behind Building 221 approximately 45 feet and includes about 6,200 square feet. Sweet birch, hemlock, and red oak dominated the tree strata, striped maple (*Acer pensylvanicum*) and American witch-hazel (*Hamamelis virginiana*) dominated the shrub layer, and common mullein and white snakeroot (*Ageratina altissima*) dominated the sparse herbaceous strata. The forested portion of the site (approximately 4,100 square feet) is located to the northwest of the wooded area and is dominated by sweet birch and tulip tree.

4.7.2 Wildlife Resources

The fish and wildlife community found at Picatinny Arsenal includes a wide variety of terrestrial mammals, birds, reptiles, and amphibians and is representative of the fauna of the northeastern United States. A total of 315 vertebrate species have been identified on the installation. These include 208 birds, 41 mammals, 26 fish, 21 amphibians, and 19 reptiles (ARDEC 1996). A blue jay (*Cyanocitta cristata*) and whitetail deer (*Odocoileus virginianus*) scat and tracks were observed on Site #1 during the October 2001 site reconnaissance. No wildlife were observed or heard in the Site #2 and #3 locations. Beaver (*Castor canadensis*) gnaw marks were observed on trees to the southeast of Site #1 in Bear Swamp.

4.7.3 Threatened and Endangered Species

One federally-listed endangered species, the Indiana bat (*Myotis sodalis*), and two federally listed threatened species, the bald eagle (*Haliaeetus leucocephalus*) and the bog turtle (*Clemmys muhlenbergi*), are known to occur at the Arsenal (Burt 2000). The peregrine falcon (*Falco peregrinus anatum*), identified in the Arsenal's Integrated Natural Resources Management Plan as a federally-listed transient species that may occur at the Arsenal, has been de-listed by the United States Fish and Wildlife Service. The bald eagle is considered to be a transient species, the Indiana bat a summer resident and the bog turtle a year round resident. A female Indiana bat was captured on the Arsenal in July 1995 and two male Indiana bats were caught on the Arsenal in the summer of 1997, suggesting a summer population of Indiana bats on or near the Arsenal. The locations of these captures were approximately 1.3 miles from the site. Hibernating Indiana bats have been discovered within 0.5 miles of the Arsenal (greater than 1.9 miles from the site), however; Indiana bat hibernacula have not been discovered on the Arsenal. A bog turtle sighting was confirmed in wetlands associated with the east branch of Green Pond Brook (greater than three miles from the site) in 1987. No bog turtle sightings have been reported at Bear Swamp, the wetland adjacent to the site, and Bear Swamp is not hydrologically connected to the Green Brook wetland.

The Indiana bat occurs in the eastern half of the United States, from northern Alabama up through New England. Indiana bat normally roost under the loose bark of dead, large-diameter trees throughout summer; however, living shagbark hickories (*Carya ovata*) and tree cavities are also used occasionally. Maternity roost sites in dead trees exposed to sunlight and located in upland forests and near streams are particularly important (Drobney and Clawson,). Suitable Indiana bat hibernating sites (cavernous areas) were not observed on or in the immediate vicinity of the three considered locations proposed for the explosives facility. Indiana bat roosting areas (mature trees) were located on and in the vicinity of all three proposed locations, and two potential foraging areas (riparian areas) are located within 2,000 feet of the proposed sites. Therefore, the summer population of Indiana bats, known to occur on or near the Arsenal, may use the three sites under consideration and/or surrounding areas for foraging and roosting.

Suitable bog turtle habitat is recognized by three criteria (suitable hydrology, soils and vegetation). Soils are the critical criterion (USFWS, 2000). Suitable hydrology is identified as having shallow surface water or saturated soils present year-round with shallow rivulets often present. Soils suitable for bog turtles consist of a soft muck substrate or scattered pockets of peat. Suitable vegetation consists of low grasses and sedges with a scrub/shrub component and an open canopy. If these criteria are present in the wetland (Bear Swamp), located to the southeast of the three proposed explosive facility locations, bog turtles could potentially occur in the wetlands. However, as indicated previously, bog turtles have not been documented in Bear Swamp.

Department of Defense facilities are not required to protect state-listed species. However, according to the Arsenal's Integrated Natural Resources Management Plan, there are ten state-listed endangered (eight birds, one snake, and one mammal) and eleven state-listed threatened (ten birds and one turtle) wildlife species known to occur at Picatinny Arsenal. Four of the state-listed endangered species, timber rattlesnake (*Crotalus horridus*), Cooper's hawk (*Accipiter cooperii*), red shouldered hawk (*Buteo lineatus*), and bobcat (*Lynx rufus*), and two of the state-listed threatened species, barred owl (*Strix varia*) and wood turtle (*Clemmys insculpta*) are identified as residing and breeding at the Arsenal. Two of the state-listed threatened bird species great blue heron (*Ardea herodias*) and northern goshawk (*Acipiter gentilis*) are identified as using the Arsenal property for foraging and nesting and foraging, respectively. The Cooper's hawk and northern goshawk are currently listed by the NJDEP as threatened and the great blue heron has been de-listed (NJDEP Natural Heritage Database, 2001). The remaining 13 state-listed bird species are listed as transient and using portions of the Arsenal during seasonal migrations (Burt 2000).

Based on maps generated to predict timber rattlesnake habitat within the Arsenal (WES, 1994), the area surrounding all three of the considered locations provides moderate to low potential summer (foraging) habitat for the timber rattlesnake. The same area provides no potential winter (hibernating) habitat for the timber rattlesnake, although the talus slope at the base of the hillside to the west of Site #1 is rated as high potential winter habitat. However, monitoring of this area over the past several decades has failed to produce sightings of timber rattlesnakes.

There are no known federally-listed endangered or threatened plants located on Arsenal property. Seven state-listed endangered plants, American featherfoil (*Hottonia inflata*), Robbin's pondweed (*Potamogeton robbinsii*), small burreed (*Sparganium minimum*), lesser bladderwort (*Utricularia minor*), wood reedgrass (*Cinna latifolia*), meadow horsetail (*Equisetum*

pratense), and large leaved holly (*Ilex montana*) occur on the Arsenal in aquatic or wetland areas (Burt 2000). Seven additional state-listed endangered plant species may potentially occur on the installation. A complete list of state and federal-listed species that occur or may occur at Picatinny Arsenal is provided in the Arsenal's Integrated Natural Resources Management Plan.

4.8 Historic Resources

Pan American Consultants, Inc. conducted an evaluation of 500 historic structures in June 1997 to determine their eligibility for inclusion on the National Register of Historic Places (NRHP). The evaluation resulted in 54 structures being recommended as eligible for listing to the NRHP as contributing structures to three historic districts, with four judged as non-contributing to a district. These evaluations, Architectural Assessment of Historic Structures at Picatinny Arsenal and Definitions of Historic Districts for Picatinny Arsenal, were presented to the New Jersey State Historic Preservation Office (SHPO) for comment in September 1998. According to the USACE Waterways Experiment Station Draft Final Report (1994), the two buildings located on Site #3 (Buildings 221 and 221A) are not listed on the NRHP. Additionally, there are no historical sites within the vicinity of the three considered sites proposed for the explosive facility.

4.9 Noise

A noise zone map developed by the U.S. Army Environmental Hygiene Agency as part of the Installation Compatible Use Zone (ICUZ) Study in 1993 indicates the level of noise generated from Installation activities and the compatibility of the generated noise with land uses on and off the Installation. Three different zones have categorized the relationship between environmental noise and land use: Zone I (compatible), Zone II (normally incompatible), and Zone III (incompatible). Zone I areas are suitable for noise-sensitive land uses such as residential housing, schools and medical facilities. Zone II and Zone III would not be appropriate for such land uses. Land uses compatible with Zone II or Zone III include various industrial and transportation facilities and some recreational activities. The three locations being considered for the explosives facility do not fall within a designated noise zone.

4.10 Transportation

Three levels of road hierarchy are found at Picatinny Arsenal. They consist of primary, secondary, and tertiary roads. Each of these levels can be further characterized by the visual assessments of rural, suburban, and urban. Primary roads provide major routes through the Installation, as well as connections between high use areas. The three site locations being considered for the explosives facility are situated on one of the Installation's secondary roads.

4.11 Planting and Landscaping

Picatinny Arsenal conveys a natural wooded image in its overall appearance and falls within Zone 6 of the United States Department of Agriculture (USDA) Plant Hardiness Map. Table 4-1 provides a list of recommended plant species appropriate for this zone. Additional plant lists

have also been provided for special situations such as recommended street trees and parking lot plantings.

Table 4-1
Recommended Plant Species for USDA Plant Hardiness Zone 6[1]

Shade Trees	
Acer rubrum	Red maple
Fraxinus pennsylvanica	Marshall's Seedless Ash ("Marshall's Seedless")
Gleditsia triacanthos "inermis"	Thornless Honeylocust
Quercus palustris	Pin Oak
Tilia americana "Redmond"	Redmond Linden
Ornamental Trees	
Amelanchier canadensis x grandiflora	Autumn Brilliance Shadblow
Cersis canadensis	Eastern Redbud
Cratagegus crusgalli "Inermis"	Thornless Cockspur Hawthorn
Magnolia stellata	Star Magnolia
Evergreen Trees – large-scale screen	
Pinus strobus	White Pine
Deciduous Shrubs	
Euonymus alatus "compactus"	Dwarf Winged Euonymus
Myrica pennsylvanica	Northern Bayberry
Viburnum lentago	Nannyberry
Evergreen Shrub	
Juniperus (species)	Junipers
Ilex glabra "Compacta"	Compact Inkberry
Kalmia latifolia "Elf"	Elf Mountain Laurel

[1]Native plants will be planted whenever possible.

5.0 ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION AND THE ALTERNATIVES

5.1 Location and Land Use

Under the proposed action, there will only be minor changes to land uses at the project site. The current site location for the proposed explosives facility consists of previously disturbed land with some paved sections. The facility will be located primarily within the previously developed portion of the site and will occupy approximately 40,000 square feet of land area. Limited removal of trees is anticipated only where necessary for the construction of a new, centralized explosives facility. The proposed facility will use existing roadways and will not require the construction of additional roadways.

As the 25 existing explosives facility's structures are demolished, land will be allowed to naturally revegetate. Planting of various native species will also be conducted throughout the affected areas and will continue to convey the natural wooded image of the Arsenal. These plantings are expected to enhance the visual character of the land while providing additional habitat for resident animal species.

5.2 Geology and Soils

Picatinny Arsenal is located in the Reading Prong of the New Jersey Highlands. The bedrock underlying the site primarily consists of resistant Precambrian granitic gneiss. Surficial deposits of glacial and alluvioglacial sediments directly overlie the granitic gneiss.

The shallow water table is perched on a three to five foot deep fragipan, a natural subsurface horizon with high bulk density relative to the overlying surface horizons and very slowly permeable to water, recharges the underlying granitic gneiss below. The Precambrian igneous and meta-sedimentary bedrock has secondary porosity in its joints and fractures. If the bedrock is exposed and then covered with an impervious surface, recharge to the bedrock will be significantly decreased. The magnitude of this environmental impact will depend upon the utility and reliance upon nearby wells screened in the bedrock aquifer.

The two major geologic faults, the Green Pond Fault and the Mount Hope Fault, in the vicinity of the site are unlikely to impact or be impacted by demolition and construction activities at the site. Based upon historic records (refer to Section 4.2), seismic activity will probably not impact demolition and construction activities at the site.

Prior to the start of demolition and construction activities, clearance of all unexploded ordnance identified in the area must be completed. Construction of the new explosives facilities will include leveling the grade of the site. Grading requires blasting and removal of soil containing boulders, cobbles, and gravel. Excavation of boulders from the soil, identified as Rockaway very stony sandy loam (RpC), may be difficult.

Blasting conducted at the site during construction activities will not alter the physical composition of the geologic units at the site, but may result in minor environmental impact. The vibrations resulting from blasting may affect local slope stability, integrity of nearby structures and wells, local groundwater flow patterns, and/or yield of nearby wells. In addition, temporary

environmental impacts caused by blasting may include noise, uncontrolled flying rock, dust, and venting gases. The construction contractor should complete a blasting plan prior to starting work at the site to mitigate effects of blasting. The plan should include use of a blasting consultant; maintenance of a safe distance for personnel and structures from the blast site; inspection of the foundations of homes, wells, and septic tanks after the blast; and monitoring vibrations of the blast using seismic surveys and a soil particle velocity meter.

Construction plans do not detail the depth to which soil will be removed. If removal of the soil exposes the fragipan layer located between 18 and 30 inches below the ground surface, water is likely to seep along the top of the fragipan into the foundations of nearby buildings and deep excavations. The permeability of water is very slow in the underlying fragipan, which restricts vertical migration of water. The seepage must be intercepted to prevent flooding and erosion. It should be the responsibility of the construction contractor to implement appropriate mitigation measures including pumping and discharge of groundwater, springs, or perched water to enable foundation or earthwork operation. The construction contractor should also be aware that such work might require a dewatering permit.

If the bedrock is exposed, water will likely infiltrate into the joints and fractures of the bedrock. However, some horizontal migration of water may be expected due to the less pervious nature of the bedrock than the previously overlying soil.

Soil excavation may also increase and/or divert surface runoff, thereby increasing the potential for erosion. However, since water capacity in the soil is low, runoff and erosion potentials are only moderate. Steep slopes will be particularly susceptible to erosion during and after construction activities. The addition of impervious surfaces, such as pavement, with effective stormwater management will significantly reduce the erosion potential created by construction activities at the site. In locations where the bedrock is exposed, erosion potential is expected to be very low. The construction contractor should implement erosion control practices such as early revegetation, breaking slopes with diversions and cross streets, and temporary vegetation covers. A SESCP is required because of the size of the disturbed area. The SESCP will be submitted to the Morris County Soil Conservation District for approval.

5.3 Air Quality

Any existing asbestos roofing materials from the structures to be demolished will be removed and disposed of in accordance with National Emission Standards for Hazardous Air Pollutants (NESHAPs) regulations and any other applicable federal, state, and local regulations. The removal of any lead paint will also be conducted to avoid contact with the affected environment. Other effects on air quality may include the short-term, temporary road dust that will likely result from truck traffic during construction and demolition.

A long-term benefit to air quality could result from a decrease in traffic in and around the Arsenal. The traffic decrease is expected as a result of centralized facilities.

5.4 Surface Water

The proposed demolition of existing explosives facilities will decrease the amount of impervious areas through revegetation of land underlying existing structures. The proposed construction

will remove existing vegetative cover and decrease the number of pervious areas. In addition to the impervious ground surfaces, rooftops on the proposed structure, as well as a parking area, will likely add increased amounts of runoff to the total volume from the site. The increase in impervious ground surfaces resulting from construction of the new facilities will be offset by the proposed demolition of 25 structures associated with the existing explosives facility. Demolition of existing structures would decrease the net amount of impervious area through natural revegetation of affected areas.

To minimize the environmental impact associated with runoff, stormwater management is essential. According to the state, the post-construction rate of runoff should be limited to 75 percent of the pre-development runoff rate for the 100-year and the 10-year storms, and to 50 percent of the pre-development rate for the 2-year storm.

The addition of impervious areas should be kept to a minimum by using the proper materials. For example, two types of paving materials are permitted for the parking surfaces at Picatinny. The first is asphalt, which is used for primary parking lots adjacent to buildings. The second, and preferred, paving material is compacted sand or crushed stone that is pervious and should be used for parking lots in residential areas. However, maintenance schedules, construction requirements, and use restrictions outlined in N.J.A.C. 7:13-2.8 should be observed even though the project is located outside of the flood hazard zone.

5.5 Wetlands

There are no wetlands located on the site identified for the proposed development; however, Bear Swamp, an approximately 12-acre wetland complex, is located to the south and southeast. Portions of this wetland complex are within 50 feet of the proposed site. The NJDEP also regulates adjacent upland areas or "transition areas." Transition areas serve as an ecological transition zone from uplands to freshwater wetlands and are an integral portion of the wetland ecosystem. They provide temporary refuge for freshwater fauna during high water episodes, are habitat for breeding, spawning, nesting, and wintering, are a natural remediation and filtration area to remove and store nutrients, sediments, petrochemicals, and other contaminants, and also act as a sediment and storm water control zone.

The regulated widths of transition areas range from 50 to 150 feet depending on the resource value of the associated wetland. Wetlands providing habitat for threatened and endangered species are considered a wetland of an exceptional resource value and are assigned a transition area of 150 feet.

Protective measures, such as silt fencing and hay bales will be employed to minimize impacts to the wetland area during construction, the closest border of the proposed site is located approximately 50 feet the Bear Swamp wetland complex. A vegetated buffer will be maintained between the facility and this wetland. Consequently, the construction and operation of the explosives facility at Site #1 will likely have minimal adverse impacts to this wetland.

5.6 Floodplains

As delineated by the USACE, the proposed site for the new explosives facility and the existing structures to be demolished throughout the Arsenal lie outside of the 100-year floodplain. Therefore, the proposed action would have no impact on the floodplain.

5.7 Flora and Fauna

5.7.1 Vegetation Resources

As mentioned previously, the land area where the new explosives facility will be constructed is largely undeveloped, previously disturbed land. It is estimated that over half of this parcel is either paved road or covered with gravel. The remaining area consists of open land with early successional vegetation and a few scattered trees. Mature trees located on this site include four red oaks (*Quercus rubra*), two white oaks (*Quercus alba*), one sweet birch, and one red maple. Two small clusters of young trees are also present on the site and include red maple, sweet birch, quaking aspen (*Populus tremula*), eastern hemlock (*Tsuga canadensis*), white ash (*Fraxinus americana*) and American sycamore (*Platanus occidentalis*). Observed early successional vegetation included daisy fleabane (*Erigeron annuus*), common mugwort (*Artemisia vulgaris*), curled dock (*Rumex crispus*), clover (*Trifolium* sp.), goldenrod (*Solidago* sp.), common mullein (*Verbascum thapsus*), English plantain (*Plantago lanceolata*), yarrow (*Achillea millefolium*), thistle (*Cirsium* sp.), dogbane (*Apocynum cannabinum*), white vervain (*Verbena urticifolia*), butter-and-eggs (*Linaria vulgaris*), common milkweed (*Asclepias syriaca*), bluestem (*Andropogon gerardii*), and grass species.

While limited tree removal is anticipated, a worst-case scenario would result in the removal of all site trees and vegetation to allow for the construction of the centralized explosives facility. Because various types of development (e.g., roads, buildings, cleared areas, and paved areas) currently surround this site, the impact is considered to be minor.

To minimize impacts to vegetation, limited tree clearing will occur where feasible and areas that have been cleared of vegetation and not developed will be planted with native plant species following completion of construction. This will accelerate reestablishment of vegetative cover and prevent colonization by weedy invasive species. Native species will also be used for the site's landscaping. (Refer to Section 4.11 for a description of replanting and landscaping plans.) Following demolition of the existing explosives facilities, affected land areas will also be replanted with native vegetation. This will result in an increase of vegetated areas over the long term.

5.7.2 *Wildlife Resources*

Wildlife species that occur within the proposed construction and demolition sites would potentially be affected. Impacts on wildlife species could include disturbance, displacement, and possible mortality. Mobile species would be displaced to comparable off-site habitat during site clearing and construction, resulting in only minor, short-term impacts. Less mobile species such as reptiles, amphibians, small mammals, as well as bird nests would be more directly affected by the proposed development and could be destroyed if they exist in the area to be cleared. To minimize impacts to wildlife, any animals encountered during construction should be avoided and not destroyed. Site clearing should also be restricted to the non-breeding season for birds.

5.7.3 *Threatened and Endangered Species*

The federally-listed, endangered, Indiana bat is known to inhabit the Arsenal property during the summer months. Three individuals have been captured on the Arsenal property: one female in 1995 and two males in 1997 during a survey conducted by Boston University. However, Indiana

bats have not been observed at the proposed site location. The Army will inspect the proposed site for potential summer roosting habitat of the Indiana bat. Although some mature trees do exist on the site, the fragmented nature of the trees and the surrounding development limit the suitability of these trees for use by the Indiana bat. Due to the absence of Indiana bat roosting (mature trees), hibernating (cavernous areas), and foraging (riparian areas) areas on the site, adverse effects to the Indiana bat or its habitat as a result of the construction of the explosives facility are not anticipated. However, three Indiana bat hibernacula are known to occur within five miles of the proposed project site and transient Indiana bats my use the site trees during summer months. Therefore, tree removal will be restricted from April 1 through November 15. Consequently, impacts to the Indiana bat resulting from project-related tree removal are anticipated to be negligible and the proposed project, following the above seasonal restriction, is not likely to adversely affect the Indiana bat.

The federally-listed threatened bog turtle was observed in 1987 on Picatinny Arsenal in wetlands associated with the east branch of Green Pond Brook that were located greater than 3 miles from Site #1. This wetland was not hydrologically connected to the wetlands adjacent to Site #1, consequently, the project will not adversely affect the bog turtle.

Potential winter den habitat of the timber rattlesnake is located to the northwest of Site #1, although timber rattlesnakes have not been sighted in the vicinity of the site. Potential den habitat in this area may be susceptible to collapse as a result of blasting during construction.

5.8 Historic Resources

None of the 25 structures that will be demolished as part of the proposed activities are listed on the NRHP as properties containing historical significance. Any remaining structures that are currently listed or are eligible for listing on the NRHP would be unaffected by the proposed construction activities. The SHPO will be consulted prior to the start of construction activities.

5.9 Noise

The proposed construction of the new explosives facility and the subsequent demolition of existing structures will have minimal short-term impacts on noise. It is expected that the noise generated from construction related equipment will elevate existing noise levels in the project area. This equipment is expected to operate on weekdays during daylight hours. Once construction and demolition are complete, noise in the project area will return to levels typical of the area.

Over the long-term, noise levels in the project area will benefit from the proposed action. By centralizing the explosives facility, the noise generated from traffic will be reduced throughout the area.

5.10 Transportation

The proposed action will use existing roadways and will not require the construction of any additional roadways. The site is situated on one of the Arsenal's secondary roadways. During the construction of the new explosives facility and the subsequent demolition of existing structures, the presence of construction equipment and construction workers' vehicles will have

short-term impacts on traffic throughout the Arsenal. These additional vehicles will most likely increase traffic during the early morning and late afternoon hours when workers are commuting to and from the site. However, because the site is located on a secondary road, these impacts are expected to be minimal.

Once the project is complete, roadways in and around the installation will likely see a decrease in the amount of vehicular traffic, resulting in a long-term benefit to transportation. As the 25 existing buildings currently associated with the explosives facility are demolished and workers are relocated to centralized facilities, workers will no longer need to rely on vehicles for transportation to and from various buildings. Despite these potential effects, the character of existing roadways will probably not change.

5.11 Planting and Landscaping

The use of tree species that currently exist in the area will enhance the image of the proposed development and will help to maintain the Arsenal's woodlands image. A tree survey should be compiled to inventory the location, species, size, and condition of existing trees prior to site planning. The use of native plant materials will be continued whenever possible. Native plants require less maintenance and irrigation and will blend in with existing wooded areas, thus creating a more consistent planting scheme within the surroundings. Native plant materials are also recommended in the more rural settings found throughout the installation. However, non-native (but acclimated) species can be introduced in densely developed areas.

Tree preservation techniques are important considerations when there is a desire to save existing trees. Care should be taken to protect the root system from compaction caused by construction equipment and the placement of fill and debris over the root zone.

Potential species to be planted as indicated in Section 4.11 serve as references only. An analysis of microclimate and other site constraints and design goals must be considered prior to the selection of suitable plant material for a specific area. Consideration should be given to the selection of appropriate tree species for parking areas. Trees with shallow root systems and those which produce fruit, sap, or have thorns should be avoided. A planting plan that uses three to five species is also less likely to produce a monoculture that could result in the loss of all the trees if they are susceptible to a pest or disease. A variety of tree species also provides a variety of colors, textures, and heights.

5.12 Socioeconomics

The proposed construction of a new explosives facility and the subsequent demolition of existing structures will have primarily short-term, minor impacts to existing socioeconomic resources. The Arsenal is proposing to spend approximately $10.4 million to complete this project, which is expected to take approximately 24 months to complete. Local workers would be employed on a full- or part-time basis for the duration of the project. Workers involved in the construction and demolition activities would be from the local labor markets, with no significant migration of workers expected. Project construction/demolition personnel spending at area retail locations, eating and drinking establishments, gasoline stations, and other businesses in the surrounding area will provide short-term benefits to the area's economy. In the long-term, it is not expected that employment needs for facility maintenance will differ from existing staffing levels.

Existing, full-time employees are also expected to conduct any plantings that are proposed under this alternative. Because the proposed action will reduce the overall number of buildings associated with explosives operations, there will be no need for increases in services such as fire and police.

5.13 Alternatives

Three alternatives were considered for the proposed project. This section assesses Sites #2 and #3 and the no-action alternatives.

Alternative 1: "Site #2"

Location and Land Use

This alternative addresses construction of the proposed facility at Site #2 (refer to Section 3.0 for a general site description). The site is currently undeveloped and is occupied by early successional vegetation and scattered trees. Development of this site would involve removal of trees and other vegetation as required, changing the current land use characteristics at the site.

Geology and Soils

Impacts from this alternative on geology and soils would be similar to those identified for the Proposed Action.

Air Quality

Impacts to air quality related to construction of a new explosives facility at Site #2 would be the same as those identified for the proposed action.

Surface Water

Activities associated with the construction of an explosives facility at Site #2 would have similar effects as those described for the Proposed Action.

Wetlands

Site #2 is located within 25 feet of a wetland (Bear Swamp). This alternative is located closer to wetlands than Site #1 (Proposed Action) and would occupy a larger percentage of the transition area. Therefore, construction and operation activities at the Site #2 location would have greater adverse indirect impact to wetlands than Site #1, although adverse impacts to wetlands would be minor as the existing transition area is largely unvegetated.

Floodplains

Floodplains associated with Site #2 would not be impacted by the construction of a new explosives facility.

Terrestrial Flora and Fauna

Effects on vegetation, wildlife and threatened or endangered species would be greater to those described for the proposed action. When compared to Site #1 (Proposed Action), Site #2 contains a larger number of mature trees that would potentially be removed by the construction at this location. As stated under the Proposed Action, removal of trees will occur on an as needed basis. Although no wildlife species were observed on the site during the October 2001

site reconnaissance, impacts on wildlife species could include disturbance, displacement, and possible mortality.

The scattered nature of mature trees associated with Site #2 creates a broken canopy, which is adjacent to an area containing open water (Bear Swamp). These elements provide potential foraging habitat for the Indiana bat. In comparison to Site #1, Site #2 contains habitat that is better suited for use by the Indiana bat, therefore, resulting in greater adverse impacts to the Indiana bat due to loss of potential foraging habitat. However, this impact would be minor as the reduction of potential foraging habitat would represent a fractional percentage of available foraging habitats on the Arsenal.

Moderate to low potential summer (foraging) habitat is present within the forested portion of the Site 3 alternative. However, the area selected for development would represent only a fraction of the timber rattlesnake habitat available at the Arsenal, and the construction and operation of the explosives facility at Site #2 would result in minor impacts to potential summer timber rattlesnake habitat. Potential winter den habitat of the timber rattlesnake is located to the northwest of Site #2. Potential dens may be susceptible to collapse as a result of blasting during construction.

Historic Resources

Construction of an explosives facility at this site would have no effect on historic resources.

Noise

Activities related to the construction of a new explosives facility at Site #2 would be expected to generate low levels of additional noise over the short-term, similar to that described for the Proposed Action. Following completion of the decommissioning activities, noise levels in the project area will benefit from construction of a new facility at this site. By centralizing the explosives facility, the noise generated from traffic will be reduced throughout the area.

Transportation

Impacts to transportation related to the construction of a new explosives facility at Site #2 would be the same as those identified for the proposed action.

Planting and Landscaping

Construction of a new explosives facility at Site #2 would have similar impacts to planting and landscaping as those identified for the proposed action.

Socioeconomics

Impacts to socioeconomic resources as a result of construction of a new explosives facility at Site #2 would be the same as those identified for the proposed action.

Alternative 2: "Site #3"

Location and Land Use

This alternative addresses construction of the proposed facility at Site #3 (refer to Section 3.0 for a general site description). The site is currently comprised of a partially maintained lawn, a disturbed wooded area, and forested land. Two buildings and a steam line with support structures also occupy this site. Development of this site would result in minor changes to the current land use characteristics at the site.

Geology and Soils

Impacts from this alternative on geology and soils would be similar to those identified for the Proposed Action.

Air Quality

Impacts to air quality related to construction of a new explosives facility at Site #3 would be the same as those identified for the proposed action.

Surface Water

Activities associated with the construction of an explosives facility at Site #3 would have similar effects as those described for the Proposed Action.

Wetlands

Site #3 is located approximately 135 feet from the wetland boundary of Bear Swamp, the farthest distance from wetlands of all the alternatives. The Site #3 alternative would result in lesser impacts to the Bear Swamp wetland than Site #1 or Site #2 because of its distance to the wetland boundary.

Floodplains

Floodplains associated with Site #3 would not be impacted by the construction of a new explosives facility.

Terrestrial Flora and Fauna

Effects on vegetation, wildlife and threatened or endangered species would be similar to those described for the proposed action. When compared to Site #1 (Proposed Action), Site #3 contains a greater number of mature trees that could possibly be affected by the construction at this location. Because the forested area is in an area of various types of development (*e.g.*, roads, buildings, cleared areas, and paved areas), the impact is considered to be minor. Removal of trees will occur on an as-needed basis. Although no wildlife species were observed on the site

during the October 2001 site reconnaissance, impacts on wildlife species could include disturbance, displacement, and possible mortality of less mobile species.

The number of mature trees located at Site #3 is greater than Site #1 (Proposed Action); however, they form a tighter canopy and are located farther from the riparian areas. Therefore, Site #3 would have less of an adverse impact to the Indiana bat than Site #1 and Site #2.

Moderate to low potential summer (foraging) habitat is present within the forested portion of the Site #3 alternative. However, the area selected for development would represent only a fraction of the timber rattlesnake habitat available at the Arsenal, and the construction and operation of the explosives facility at the Site #3 would result in minor impacts to potential summer timber rattlesnake habitat. Potential winter den habitat of the timber rattlesnake is located to the northwest of Site #3. Potential dens may be susceptible to collapse as a result of blasting during construction.

Historic Resources

Construction of an explosives facility at this site would have no effect on historic resources.

Noise

Activities related to the construction of a new explosives facility at Site #3 would be expected to generate low levels of additional noise over the short-term, similar to that described for the Proposed Action. Following completion of the decommissioning activities, noise levels in the project area will benefit from construction of a new facility at this site. By centralizing the explosives facility, the noise generated from traffic will be reduced throughout the area.

Transportation

Impacts to transportation related to the construction of a new explosives facility at Site #3 would be the same as those identified for the proposed action.

Planting and Landscaping

Construction of a new explosives facility at Site #3 would have similar impacts to planting and landscaping as those identified for the proposed action.

Socioeconomics

Impacts to socioeconomic resources as a result of construction of a new explosives facility at Site #3 would be the same as those identified for the proposed action.

Alternative 3: "No Action"

Location and Land Use

The "No Action" alternative considered by the Arsenal involves the continued maintenance of existing explosives facilities with no enhancements. This alternative would maintain existing land uses in their current condition.

Geology and Soils

Geology and soils would not be impacted by this alternative, as no construction or demolition activities would take place. Similarly, stormwater runoff would not be impacted by this alternative.

Air Quality

The continued maintenance of existing explosives facilities with no enhancements would have no effect on air quality.

Surface Water

No effects to surface water would result from implementation of this alternative.

Wetlands, Floodplains, Terrestrial Flora and Fauna

Maintaining the existing explosives facilities in their current condition with no construction or demolition activities would result in no impacts to wetlands, floodplains, vegetation, wildlife and threatened or endangered species.

Historic Resources

This alternative provides for the existing explosives facilities to be maintained in their current condition. None of these structures are listed on the NRHP as properties containing historical significance. Therefore, historic resources would not be affected under this alternative.

Noise

Maintaining the existing explosives facilities in their current condition would have no effect on noise levels within or adjacent to the project area.

Transportation

Maintaining the existing explosives facilities in their current condition with no enhancements would have no effect on transportation within the Arsenal.

Planting and Landscaping

This alternative would not have any effect on the existing landscape and therefore would not require any re-planting activities.

Socioeconomics

The no action alternative would maintain existing explosives facilities in their current size, configuration, and condition. This alternative would have no effect on existing socioeconomic resources of the Arsenal or the surrounding area.

6.0 CONCLUSION OR FINDINGS ON WHETHER THE ENVIRONMENTAL IMPACTS ARE SIGNIFICANT

This section summarizes the conclusions regarding the proposed action for the explosives facility and the alternatives considered by the Picatinny Arsenal. Section 2 of this document contains a description of the proposed action by the Arsenal, while Section 3 describes reasonable alternatives that were considered. The evaluation of the existing explosives facilities includes the following four alternatives:

(1) Construction of a new, state-of-the-art explosives facility as proposed by the Arsenal at Site #1. This alternative proposes the demolition of 25 existing structures and the construction of a new, modernized facility that will centrally locate explosives operations. The new facility will meet current safety, accessibility, and construction standards.

(2) Construction of a new, state-of-the-art explosives facility at Site #2. Except for the site location, this alternative is identical to the Proposed Action.

(3) Construction of a new, state-of-the-art explosives facility at Site #3. Except for the site location, this alternative is identical to the Proposed Action.

(4) No action alternative, resulting in no change to the current explosives facilities. Existing structures would be maintained with no enhancements.

Table 6-1 summarizes the anticipated environmental effects for the alternatives considered. As can be seen from the table, implementation of the Proposed Action would have the most significant impacts on geology, stormwater runoff, and threatened and endangered species habitat.

An increase in impervious surface (i.e., pavement) could reduce the amount of recharge to underlying bedrock. Reducing or avoiding the amount of bedrock that is exposed and then covered with an impervious surface could minimize the magnitude of this environmental impact. Also, the amount of impervious surface can be kept to a minimum by using material such as compacted sand or crushed stone as an alternative to asphalt paving. Such actions will also help to prevent any flooding or erosion due to seepage of water into the fragipan.

Although construction of the proposed explosives facility will likely increase the amount of impervious ground surface, subsequent demolition of existing structures will more than off-set that effect by allowing affected areas to revegetate. It is expected that a net decrease in impervious ground surface will result.

The proposed actions would result in a minor loss or degradation of potential habitat for the federally-listed endangered Indian bat, and the state-listed endangered timber rattlesnake. Mature trees suitable for summer roosting habitat of the Indiana bat will be removed during construction. The proposed location or its alternatives would also result in a loss of moderate to low potential timber rattlesnake foraging habitat as a consequence of construction and operation and a possible degradation of potential timber rattlesnake winter den habitat as a consequence of blasting. The loss or possible degradation of these potential habitats would result in a minor adverse impact to these species as their use of these areas is undocumented and removal of this habitat would represent a small fraction of available habitat at the Arsenal.

In addition to the potentially adverse impacts described above, the proposed action is expected to benefit noise levels and transportation at the Arsenal. By centralizing the explosives facility, workers will no longer need to rely on their vehicles to travel between buildings. As a result, traffic and the noise generated from traffic will be greatly reduced throughout the area. A reduction in traffic could also help to improve the air quality of the surrounding area by decreasing the amount of exhaust entering the environment. Effects of the proposed project on resources of principal national recognition are summarized in Table 6-2.

Although the proposed action will likely have both positive and negative effects on environmental resources, as described above, any adverse effects will be far outweighed by the benefits. Unless action is taken, the ability of the EWD to perform its duties will be severely hindered. Under current conditions, the EWD cannot use their resources effectively or concentrate their efforts on developing, evaluating, and improving explosive formulations that are both cost-effective and environmentally friendly. In addition, the research and development of new explosive formulations at the new location would be conducted under improved safety conditions.

Table 6-1
Alternatives Considered
Sheet 1 of 4

RESOURCES	PROPOSED ACTION (SITE #!)	SITE #2	SITE #3	NO ACTION
Location and Land Use	Minor changes to land uses at the proposed project site are expected. Limited removal of trees is anticipated only where necessary. Existing roadways will be utilized. Natural revegetation and plantings will enhance visual character and provide additional habitat.	Same as the Proposed Action.	Same as the Proposed Action.	Existing land uses would be maintained in their current condition, with no enhancements.
Geology and Soils	The addition of impervious surfaces, along with effective stormwater management, will significantly reduce the soil erosion potential resulting from construction activities. A soil erosion and sediment control plan and a blasting plan will also be implemented to further reduce any impacts. Short-term impacts may include flying rock, dust, and venting gases.	Same as the Proposed Action.	Same as the Proposed Action.	No change.
Air Quality	Short-term, temporary road dust will likely result from truck traffic during construction and demolition activities. However, decreased traffic, as the result of a centralized facility, could help to improve air quality.	Same as the Proposed Action.	Same as the Proposed Action.	No change.

Table 6-1
Alternatives Considered
Sheet 2 of 4

RESOURCES	PROPOSED ACTION (SITE #1)	SITE #2	SITE #3	NO ACTION
Surface Water	The amount of runoff from the proposed site is expected to increase as a result of an increase in impervious ground surfaces and roof tops on proposed structures, and removal of vegetation. Impacts will be minimized with proper stormwater management.	Same as the Proposed Action.	Same as the Proposed Action.	No change.
Wetlands	No wetland areas are located on the proposed site.	Same as the Proposed Action.	Same as the Proposed Action.	No change.
Floodplains	All proposed activities will occur outside the 100-year floodplain, as delineated by the USACE.	Same as the Proposed Action.	Same as the Proposed Action.	No change.
Bio/Ecosystems	Removal of trees and vegetation will occur only where necessary, and impacts are expected to be minor. Affected areas will be allowed to naturally revegetate following completion of construction, and replanting of native species will occur throughout the site. Impacts to wildlife species could include disturbance, displacement, and possible mortality of less mobile species. Minor loss of potential summer habitat and possible minor degradation to potential winter habitat of timber rattlesnake.	Same as the Proposed Action.	Same as the Proposed Action.	No change.

Table 6-1
Alternatives Considered
Sheet 3 of 4

RESOURCES	PROPOSED ACTION (SITE #1)	SITE #2	SITE #3	NO ACTION
Historic Resources	There are no sites either listed or eligible for listing on the NRHP that occur within the affected area, therefore no effects are anticipated as a result of this alternative.	None of the existing structures are listed or eligible for listing on the NRHP, therefore historic resources would not be affected by this alternative.	None of the existing structures are listed or eligible for listing on the NRHP, therefore historic resources would not be affected by this alternative.	No change.
Noise	Minimal, short-term impacts are expected as a result of noise generated from construction related equipment. It is expected that noise generated from traffic will be greatly reduced, benefiting noise levels over the long-term.	Same as the Proposed Action.	Same as the Proposed Action.	No change.
Transportation	The presence of construction equipment and construction workers' vehicles will have minimal, short-term impacts on traffic during early morning and late afternoon hours. Once the project is complete, roadways in and around the installation will likely see a decrease in the amount of vehicular traffic, resulting in a long-term benefit to transportation.	Same as the Proposed Action.	Same as the Proposed Action.	No change.

Table 6-1
Alternatives Considered
Sheet 4 of 4

RESOURCES	PROPOSED ACTION (SITE #1)	SITE #2	SITE #3	NO ACTION
Planting and Landscaping	Preservation techniques will be implemented for existing trees that are to be saved. Any impacts that revegetation might introduce will be minimized by using various native species.	Same as the Proposed Action.	Same as the Proposed Action.	No change.
Socioeconomics	The spending of project personnel at area businesses will provide short-term benefits to the economy. In the long-term, it is not expected that employment and community service needs (*i.e.*, police and fire) associated with the new facility will differ from existing levels.	Same as the Proposed Action.	Same as the Proposed Action.	No change.

Table 6-2
Effects of the Picatinny Arsenal Explosives Facility
on Resources of Principal National Recognition

TYPES OF RESOURCES	PRINCIPAL SOURCES OF NATIONAL RECOGNITION	MEASUREMENTS OF EFFECTS
Air Quality	Clean Air Act, as amended (42 USC 1857 h-7 et. seq.)	No change in air quality classifications
Endangered & Threatened Species/Critical Habitat	Endangered Species Act of 1973, as amended (16 USC Sec. 1531 et. seq.)	Minor decrease in potential summer roosting habitat for Indiana bats
		Minor decrease in moderate to low timber rattlesnake potential summer habitat
		Minor degradation to timber rattlesnake potential winter den habitat.
Fish and Wildlife Habitat	Fish and Wildlife Coordination Act (16 USC Sec. 661 et. seq.)	Removal of woody vegetation may impact less mobile species depending on schedule
Floodplains	Executive Order 11988, Floodplain Management	No floodplain areas gained or lost
Historic & Cultural Properties	National Historic Preservation Act of 1966, as amended (16 USC Sec. 470 et. seq.)	No National Register eligible or listed properties affected
Water Quality	Clean Water Act (33 USC 1251 et. seq.)	No change in state water quality classifications; stormwater management system to be employed
Wetlands	Executive Order 11990, Protection of Wetlands	No wetlands lost or gained.

7.0 LISTING OF PERSONS AND ORGANIZATIONS CONSULTED

Persons and Organizations Consulted. The following agencies, organizations, and personnel were consulted during the preparation of this environmental assessment:

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Mr. Jon Van De Venter, Natural Resource Manager, TACOM-ARDEC

Ms. Dorothy Guzzo, New Jersey Historic Preservation Office

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APPENDIX A

ENERGETIC AND CHEMICAL MATERIALS TO BE STORED AT THE NEW EXPLOSIVES RESEARCH AND DEVELOPMENT LOADING FACILITY

ENERGETIC MATERIALS	HCSDS#
Explosive, HMX	129
Explosive, RDX	67
Explosive, CL-20	N/A
Explosive, TNAZ	N/A
TNT	33
Explosive, Composition PBXN-5	622
Explosive, Composition, HBX-6 or H-6	829
Explosive, Composition, HTA-3	630
Explosive, Octol, 75/25	824
Explosive, Composition, PBX-9011	1059
Explosive, Composition, PBX-9407	993
Explosive, Composition, PBX-9501	931
Explosive, Composition, PBX-9404	
Explosive, Composition A5	546
Explosive, Composition A-3	150
Explosive, Composition LX-14-0	1043
Explosive, Composition PBX X-0298	1768
Explosive, Composition PBX 9502	1060
Explosive, Composition, Octol, 70/30	154
Explosive, Composition C4	77
Explosive, Composition PAX-2a	
Explosive, Composition PAX-3	
Explosive, Composition PAX-12	
Explosive, Composition B, MOD 1	1276
Explosive, Composition B, MOD 2	1277
Explosive, Composition B, MOD 3	1278
Explosive, Composition CH6	
Explosive, Composition HMX/KEL-F (95/5)	693
Explosive, Composition RDX Blend (98/2)	1465
Explosive, PENTOLITE 50/50	253
Explosive, PETN (Pentaerythrite Tetranitrate)	87
Explosive, TATB	1029
Ammonium Nitrate	252
Nitroguanidine	491

CHEMICALS	HCSDS#
Acetone	230
Ammonium Hydroxide	709
Alcohol	
MEK	
N-methylpyrrolidinone	
Nitric Acid	
Cyclohexanone	
Hexane	
Octane	
HyTemp	4454
Estane	
Viton-a	
Dioctyladepate	
Polyisobutylene	
Bis(2-2-dinitroptopyl)acetal/	
Bis(2-2-dinitroptopyl)formal BDNPA-F	
Kel-F	

FINAL REPORT

GEOTECHNICAL INVESTIGATION

EXPLOSIVES R&D LOADING FACILITY AND UNDERGROUND CABLE

PICATINNY ARSENAL, DOVER, NEW JERSEY

Prepared for
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1.1 GENERAL

This report presents the results of a geotechnical investigation performed by URS Corporation (URS) for a the proposed Explosive R&D Loading Facility and proposed underground fiber-optic cable installation at the Picatinny Arsenal in Dover, New Jersey. Our understanding of the requirements of the project are based primarily on the "Scope of Work" and a site visit that took place on December 5, 2003. The scope of work was received on December 12, 2003, as prepared by the US Army Corps of Engineers (USACE), Norfolk District.

1.2 PROJECT LOCATION AND DESCRIPTION

As shown on Figure 1, the site of the proposed construction is located at the Picatinny Arsenal, in Dover, New Jersey.

Explosive R&D Loading Facility

The proposed building site is located in the western portion of the Picatinny Arsenal complex within an area referred to as the "Enclosure." The proposed building site is west of 5th Avenue. There are three buildings currently on the site, Building Nos. 213, 215 and 216. Bear Swamp is located to the east of 5th Avenue and several smaller wooden structures and above ground utilities (steam pipes) are present to the west of Phipps Road.

Presently, very little information is available regarding the proposed building, including its location and column and/or wall loads. This report is based on the building having no basement level.

Underground Cable

The underground cable construction is proposed to proceed from the Explosive R&D Loading Facility site to the north along 5th Avenue and then east along 10th Street to the intersection with Reily Road. At the time of this investigation, the exact location of the underground cable was not known. Therefore, the test pits performed for this cable were performed randomly along 5th Avenue and 10th Street.

1.3 OBJECTIVE AND SCOPE OF SERVICES

The objective of this investigation is to evaluate the subsurface conditions at the proposed building site and underground cable route and to provide geotechnical recommendations for the design and construction of the foundations of the proposed building. In order to achieve these objectives, the following scope of services was performed:

1. Provided full-time controlled inspection of the drilling operation by a qualified URS geotechnical engineer.
2. Performed a laboratory testing program on representative soil samples.
3. Prepared this written summary report that includes the following:

a) Description of the test borings and laboratory testing procedures and results of testing conducted;

b) A Test Boring and Test Pit Location Plan showing the locations of the as-drilled test pits and borings;

c) A subsurface cross-section indicating generalized soil conditions encountered during the test program;

d) Results of engineering evaluations and recommendations regarding the foundation design including:

- Foundation type, estimated capacity, and bearing elevation;
- Settlement estimates, if shallow foundation is recommended;
- Geotechnical earthquake engineering considerations including soil profile type;
- Permanent groundwater control measures, if necessary.

f) Results of engineering evaluations and recommendations regarding the construction of the foundations including:

- Temporary groundwater control considerations, if necessary;
- Construction monitoring considerations including compaction control.

g) Appendices that include test boring logs and laboratory test results.

2.1 GENERAL

The subsurface investigation consisted of a field investigation program and a laboratory testing program. The field investigation program consisted of performing test borings and test pits for determining soil and rock conditions under the site. The laboratory testing program consisted of performing sieve analyses to verify the field classification of the soil samples. Details of the subsurface investigation are described in the following sections.

2.2 FIELD INVESTIGATION

The subsurface exploration program performed by URS consisted of drilling 7 test borings and 37 test pits. The borings are identified as B-1 through B-7. The test pits in the proposed building area are identified as TPB-1 through TPB-20, and the test pits along the proposed underground cable route are identified as TP-1 through TP-18. It should be noted that TPB-13 was not performed due to the proximity of the test pit to the steam line located along Phipps Road. The approximate locations of the test borings and test pits are shown in Figures 3 through 6. The test boring logs and test pit logs are included in Appendix A.

The test borings were performed from January 27 to February 4, 2004 by Jersey Boring and Drilling Inc., of Newark, NJ and inspected on a full time basis by our geotechnical engineer Ms. Drina Ferreira of URS Corporation. The test borings were performed using a truck mounted drill rig. The test borings were advanced using rotary drilling techniques with a 3-7/8 inch diameter tri-cone roller bit. Soil samples were obtained using techniques and equipment in general accordance with the American Society for Testing and Materials (ASTM) Standard Specification D1586-Standard Penetration Test (SPT). The SPT consists of driving a 2-in. O.D. split-spoon sampler with repeated blows of a 140-pound hammer freely falling a distance of 30-inches. The standard penetration, or N-value, is the number of blows required to advance the sampler the 12 inches after an initial 6 inches penetration. SPT samples were obtained at regular depth intervals that did not exceed 5 feet. The soil samples obtained from the borings were visually classified by the URS field personnel by using the Unified Soil Classification System. The sample jars were transported to the URS laboratory in Totowa, New Jersey for testing and storage.

Test pits were performed in two phases. During the first phase, test pits along the proposed underground cable route as well as test pits TPB-1 through TPB-8 in the proposed building area were performed on January 23, January 24 and January 30, 2004 by a subcontractor to Jersey Boring and Drilling, and inspected on a full time basis by our geotechnical engineers Mr. Peter Matheos and Ms. Drina Ferreira. Test pit depths ranged from 1.5 to 8 ft and were performed using a CAT 430D backhoe. A supplemental test pit program performed on May 3 and May 4, 2004 consisted of the performance of 11 test pits in the proposed building area, TPB-9 through TPB-20 (TPB-13 was not performed). A CAT 426 backhoe was used to perform the supplemental test pits.

The approximate location of groundwater was noted, where possible, as the borings were being drilled. Surface water was noted to the east of the proposed building location in Bear Swamp. In addition, water was noted infiltrating into several test pits from the side walls.

2.3 LABORATORY TESTING

Laboratory testing of soil samples obtained from the test borings was performed at URS' Geotechnical Laboratory in Totowa, New Jersey. The purpose of the testing was to verify the field visual classifications and obtain information for subsequent engineering evaluations. Grain size analyses were performed on16 samples in accordance with ASTM Standard D422-63. The results of the laboratory tests are included in Appendix B of this report.

2.4 GENERALIZED SUBSURFACE CONDITIONS

The following strata were encountered during of the subsurface investigation. Figure 7 shows a generalized subsurface profile showing the estimated location of these strata.

Stratum 1: FILL. This stratum consists of a brown coarse to fine sand, with trace to some gravel and silt. Boulders and construction debris were occasionally encountered within this stratum. In some borings and test pits, this stratum was intermixed or overlain with topsoil and roots from nearby vegetation. SPT N-values in the Fill ranged from 10 blows per foot (bpf) to over 100 bpf, indicative of a medium dense to very dense material.

Stratum 2: SAND/SILT. This stratum consists of a medium to very dense olive gray or brown silty sand or sandy silt. The sand fraction was generally coarse to fine and some samples indicated trace to some clay and gravel. Occasional boulders were encountered. SPT N-values in the sand/silt stratum ranged from 10 bpf to over 100 bpf, indicative of a medium dense to very dense material. A pocket of dense gravel with some coarse to fine sand was encountered within this stratum while drilling through boring B-5. All borings were terminated within the sand/silt stratum.

Rock was encountered along the proposed underground cable route in test pits TP-3 (weathered rock at 3ft), TP-4 (at 4 ft), TP-6 (at 7 ft), TP-7 (weathered rock at 5.5 ft), TP-8 (at 0.5 ft), and TP-10 (at 10 ft below the ground surface). A rock sample that broke off and was retrieved while performing test pit TP-4 was classified as Gneiss of the Losee formation. No rock was encountered in the proposed building area.

Numerous boulders were encountered while performing the test pits in the proposed building area and along the proposed underground cable route. Boulders ranged in size from 1 ft^3 to as large as 16 ft^3. An estimation of the percentage of boulders and cobbles by volume is included, where encountered, in each of the logs for the supplemental test pits. The indicated percentages are based solely on visual observations within the confines of the test pit and may not be indicative of the percentage of boulders and cobbles in the general area. Although not as obvious, boulders were also encountered in some of the test borings, as evidenced by drilling difficulties that occurred. Brick and other construction debris was pronounced in two test pits: TP-2 and TP-15 and TPB-20. In addition, some construction debris and other loose fill were encountered in TPB-7.

3.1 GENERAL

This section presents our recommendations for feasible foundation systems for the proposed building, earthquake considerations, lateral earth and rock pressures, excavations considerations, temporary and permanent groundwater control, backfill and compaction requirements and construction monitoring. Our evaluation and recommendations are based on the subsurface conditions encountered at the boring locations, our understanding of the site geology, foundation loading information and construction considerations.

3.2 FOUNDATION RECOMMENDATIONS

We recommend using a shallow foundation for the proposed building. Subsurface data indicates that the proposed building can be supported on footings founded on Stratum 2. We recommend an allowable bearing pressure of 3 tsf for the footings. The estimated settlement for this bearing pressure is likely to be less than 1 inch. The footings should be placed below Stratum 1 and a minimum depth of 40 in. below final grade to protect against frost conditions. It is likely that boulders will be encountered during foundation excavation and site preparation. When boulders are encountered, they should be removed and any voids backfilled with structural fill (see Section 3.6). In addition, it is also recommended that, upon approval of the bearing surface, crushed stone, or a mud slab, be placed so that the bearing surface is preserved until the concrete footing can be poured.

We recommend supporting the floor slab as slab-on-grade. In order to limit any differential settlements of the slab, we recommend that the soil subgrade be proof-rolled using a smooth drum vibratory roller to stabilize potentially loose soils in the upper one foot of the subgrade. Any unstable areas encountered that cannot be stabilized by additional compaction should be excavated to competent material and the area backfilled with compacted structural fill. The proof-rolling should not be performed when the subgrade is wet, muddy, or frozen. If foundations are constructed in the winter, the subgrade should be protected from frost action to limit possible subgrade deterioration.

3.3 EXCAVATION CONSIDERATIONS

Local temporary soil excavations (e.g., for excavation of spread footings) above the natural groundwater level can have cut slopes as steep as 1H:1V. Temporary soil excavations below the groundwater level should be no steeper than 2H:1V.

The design of any soil slopes will be the responsibility of the foundation contractor's engineer. Design of temporary cuts and braced excavations should conform to pertinent OSHA and local safety regulations.

3.4 EARTHQUAKE CONSIDERATIONS

The subsurface conditions at the site generally consist of medium dense to dense silty sands and sandy silts. Therefore, the soil profile type, in accordance with IBC (2000), for this site is S_D.

Because of the high density of the soils, liquefaction potential does not appear to be a concern at this site.

3.5 GROUNDWATER CONTROL

Measurements taken in the borings and water infiltrating into the test pits indicate that the groundwater level is approximately at el. +708 ft. However, these measurements were taken over a very short time period and may not adequately reflect the seasonal variations in groundwater levels. Considering this, we recommend a design ground water elevation of el. +710 ft. for the proposed building area. The need for permanent ground water control (e.g. underdrain system, pressure slab, etc.) should be addressed during design by taking into account the elevation of the floor slab and the design ground water elevation.

Depending on the thickness of the footings and the Contractor's construction techniques, it is possible that groundwater will be encountered during construction of the shallow foundations. If groundwater is encountered, it is anticipated that the amount of seepage will be relatively small and could be handled by pumping from sumps.

3.6 BACKFILL AND COMPACTION REQUIREMENTS

Select backfill or structural backfill should be granular soils free of cinder, brick, asphalt, ash, and other unsuitable materials. The natural soil materials can be selectively used as structural backfill. The silty soils are moisture sensitive and would be difficult to compact in periods of prolonged wet and/or freezing weather. The primarily sandy soils can be used as structural fill provided that shot rock, boulders, and cobbles larger than about 4 in. across are removed prior to placement. We recommend that structural backfill or select backfill beneath slabs-on-grade be compacted to a minimum of 95% of the maximum dry density, as determined by ASTM D1557-88, Method C. All backfill should be placed in lifts not exceeding 8 in. in loose thickness. The subgrade underneath the backfill should be satisfactorily proofrolled prior to placement of backfill and should meet the same density requirements as the backfill to be placed above the subgrade.

3.7 CONSTRUCTION INSPECTION

It is recommended that a geotechnical engineer/geologist familiar with the subsurface conditions and foundation design criteria be present during excavation and foundation construction. These services should include the following:

- Review and approval of contractor submittals related to foundation construction;
- Observation and documentation of all phases of excavation and foundation construction;
- Controlled inspection of subgrades;
- Monitoring of subgrade preparation and structural fill placement and compaction.

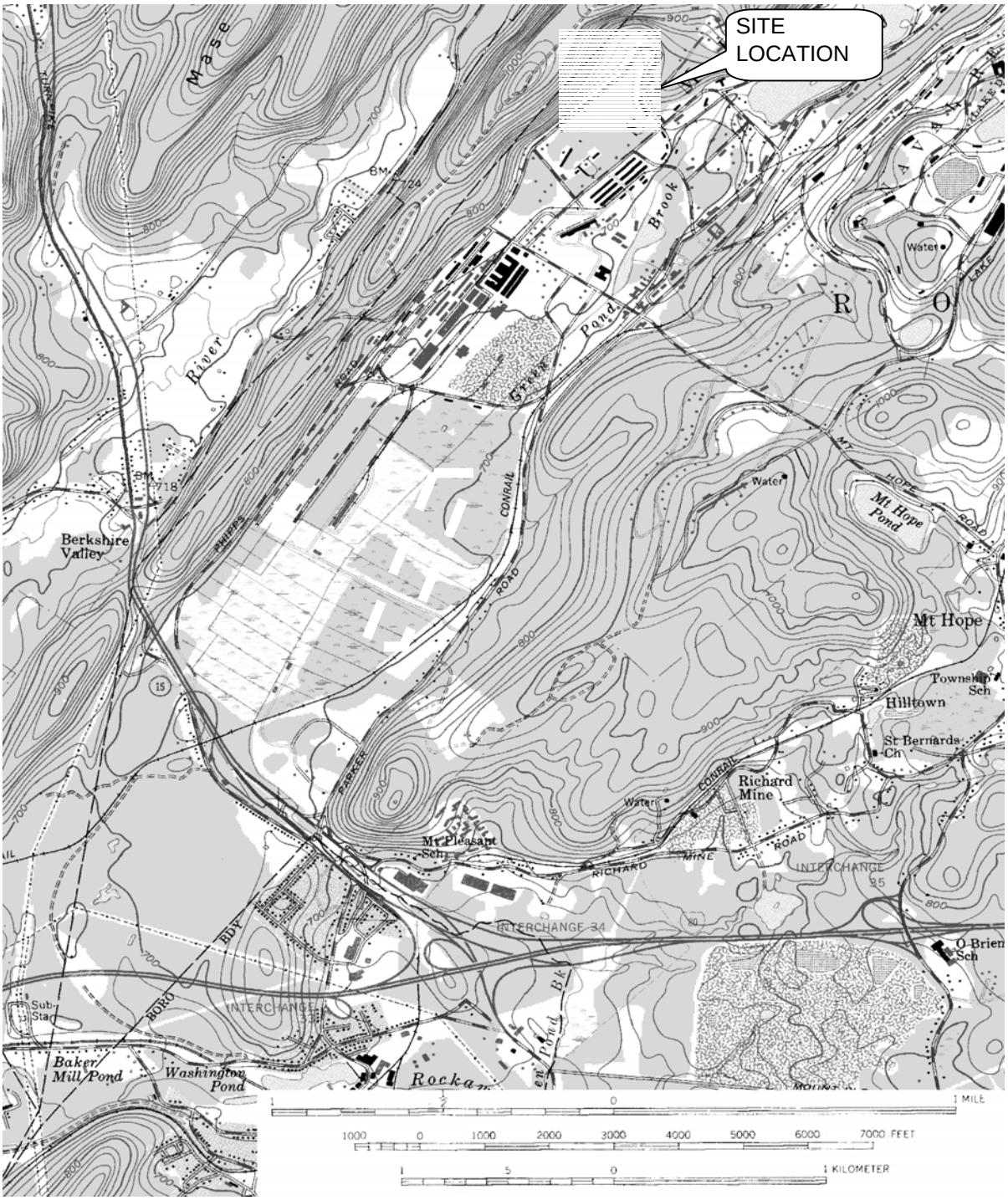
Our conclusions and summary of recommendations are as follows:

1. Subsurface data indicates that the proposed building can be supported on footings founded on Stratum 2. We recommend an allowable bearing pressure of 3 tsf for the footings. The footings should be placed below Stratum 1 and a minimum depth of 40 in. below final grade to protect against frost conditions. It is likely that boulders will be encountered during foundation excavation and site preparation.
2. The seismic soil profile type for this site is S_D based on the IBC (2000).
3. We recommend a design ground water elevation of el. +710 ft. The need for permanent ground water control should be addressed during design by taking into account the elevation of the floor slab and the design ground water elevation.
4. Structural backfill beneath slabs on grade or footings should be compacted to a minimum of 95% of the maximum dry density.
5. It is recommended that a geotechnical engineer/geologist familiar with the subsurface conditions and foundation design criteria be present during excavation and foundation construction.

Professional judgments were necessary in relation to determining stratigraphy and soil properties from the subsurface investigations. Such judgments were based partly on the evaluation of the technical information gathered, and partly on our experience with similar projects. If further investigation reveals differences in the subsurface conditions and/or groundwater level, or if the proposed building design is different from those indicated herein, it is recommended that we be given the opportunity to review the new information and modify our recommendations if deemed appropriate.

The results presented in this report are applicable only to the present study, and should not be used for any other purpose without our review and consent. This study has been conducted in accordance with the standard of care commonly used as state-of-the-practice in the profession. No other warranties are either expressed or implied.

FIGURES



Map Sources:
USGS DOVER, NJ

7.5' Quadrangle 1:25k

SITE LOCATION PLAN
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS

WAYNE, NEW JERSEY

DR. BY: PAM	SCALE: As Shown	PROJ NO: 11655665
CK'D. BY: TGT	DATE: MAR 1, 2004	FIG NO: 1

I:\Projects\11655665(Picatinny)\Report\[sitelocation.xls]8X11PORT

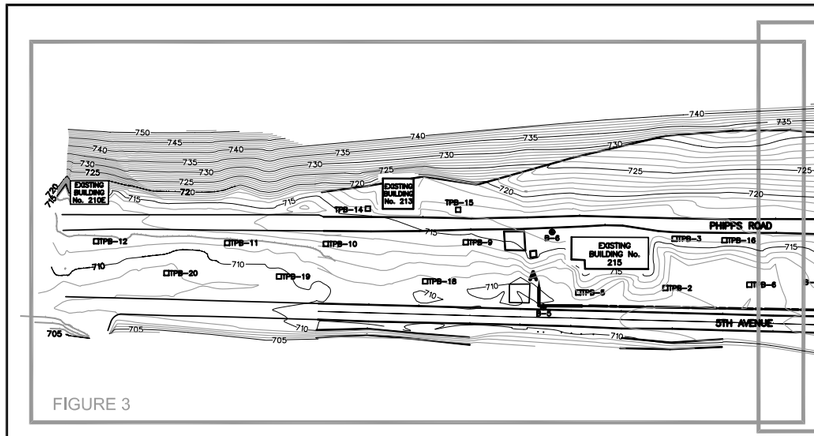


FIGURE 3

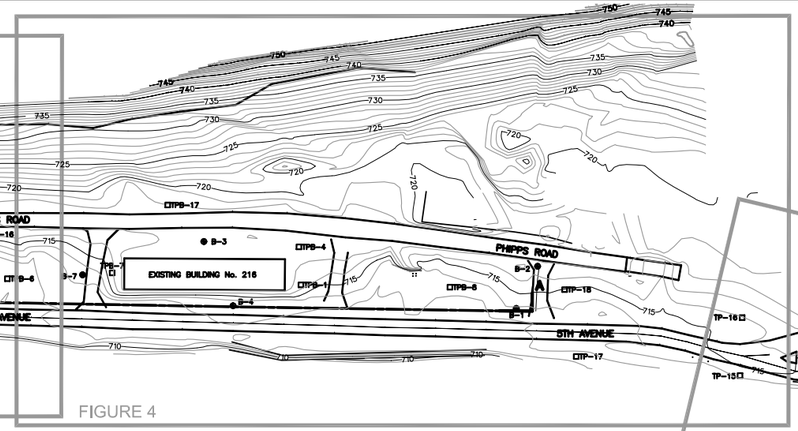


FIGURE 4

FIGURE 5

FIGURE 6

NOTE

SURVEY BY MEDINA CONSULTANTS, P.C., FEBRUARY 2004.

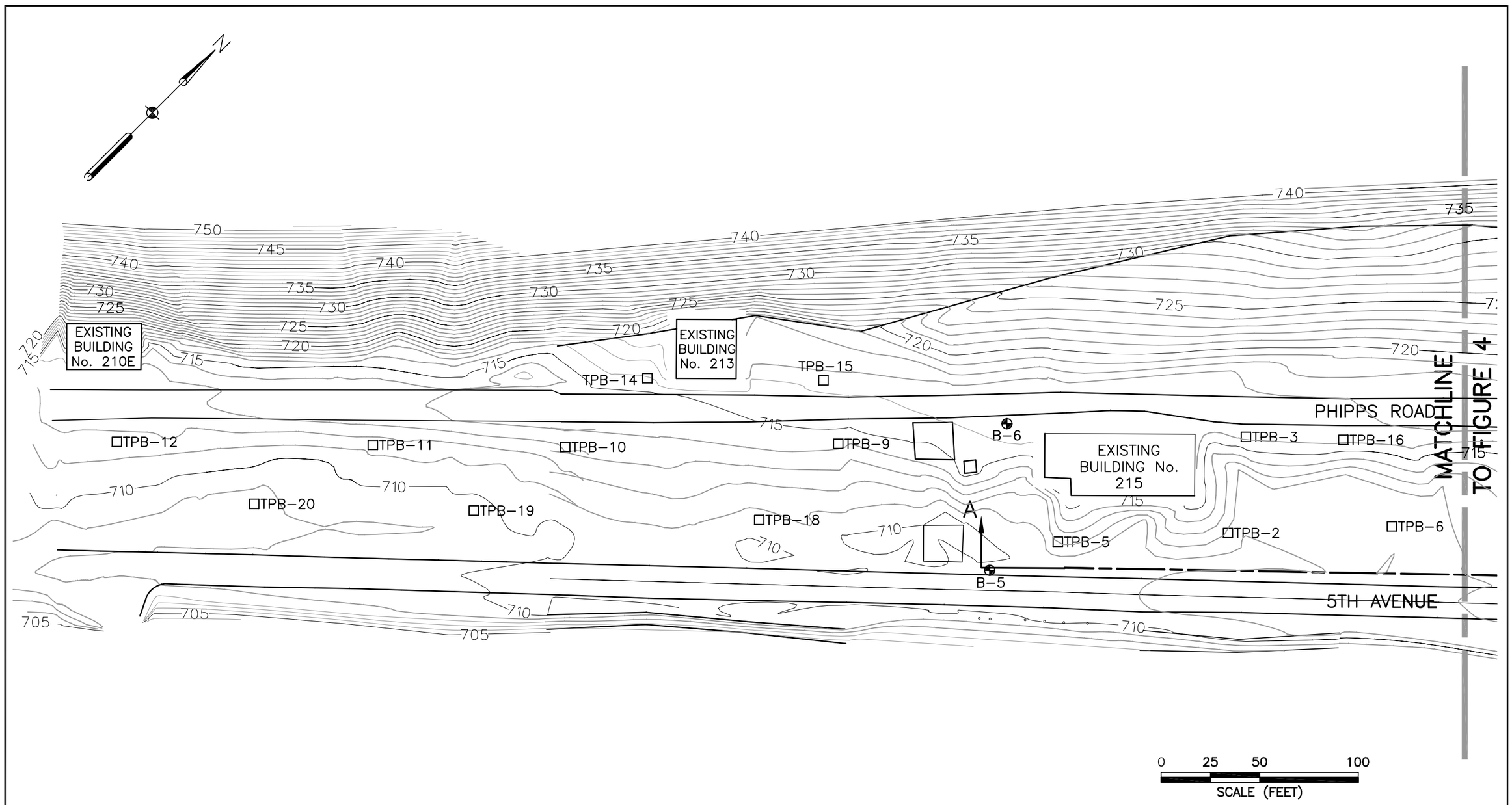
0 150 300

SCALE (FEET)

SITE PLAN
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO.	FIG-2	PROJ. NO.	11655665
CK'D. BY	PM	DATE	FEB. 27, 2004	FIG. NO.	2		



LEGEND

- ◓ B-5 APPROXIMATE NUMBER AND LOCATION OF BORING
- □ TPB-2 APPROXIMATE NUMBER AND LOCATION OF TEST PIT

NOTE

1. SURVEY BY MEDINA CONSULTANTS, P.C., FEBRUARY 2004.
2. VERTICAL DATUM: NGVD 29

BORING AND TEST PIT LOCATION PLAN
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. FIG-3	PROJ. NO. 11655665
CK'D. BY	PM	DATE	FEB. 27, 2004	FIG. NO. 3	

N

750
745
740
735
730
725
720

MATCHLINE TO FIGURE 3

MATCHLINE TO FIGURE 5

TPB-17

B-3

TPB-4

TPB-7

EXISTING BUILDING No. 216

B-7

TPB-6

TPB-1

B-4

TPB-8

B-2

A

TP-18

B-1

PHIPPS ROAD

5TH AVENUE

TP-16

TP-17

TP-15

715

710

0 25 50 100

SCALE (FEET)

LEGEND

B-5 APPROXIMATE NUMBER AND LOCATION OF BORING

TPB-2 APPROXIMATE NUMBER AND LOCATION OF TEST PIT

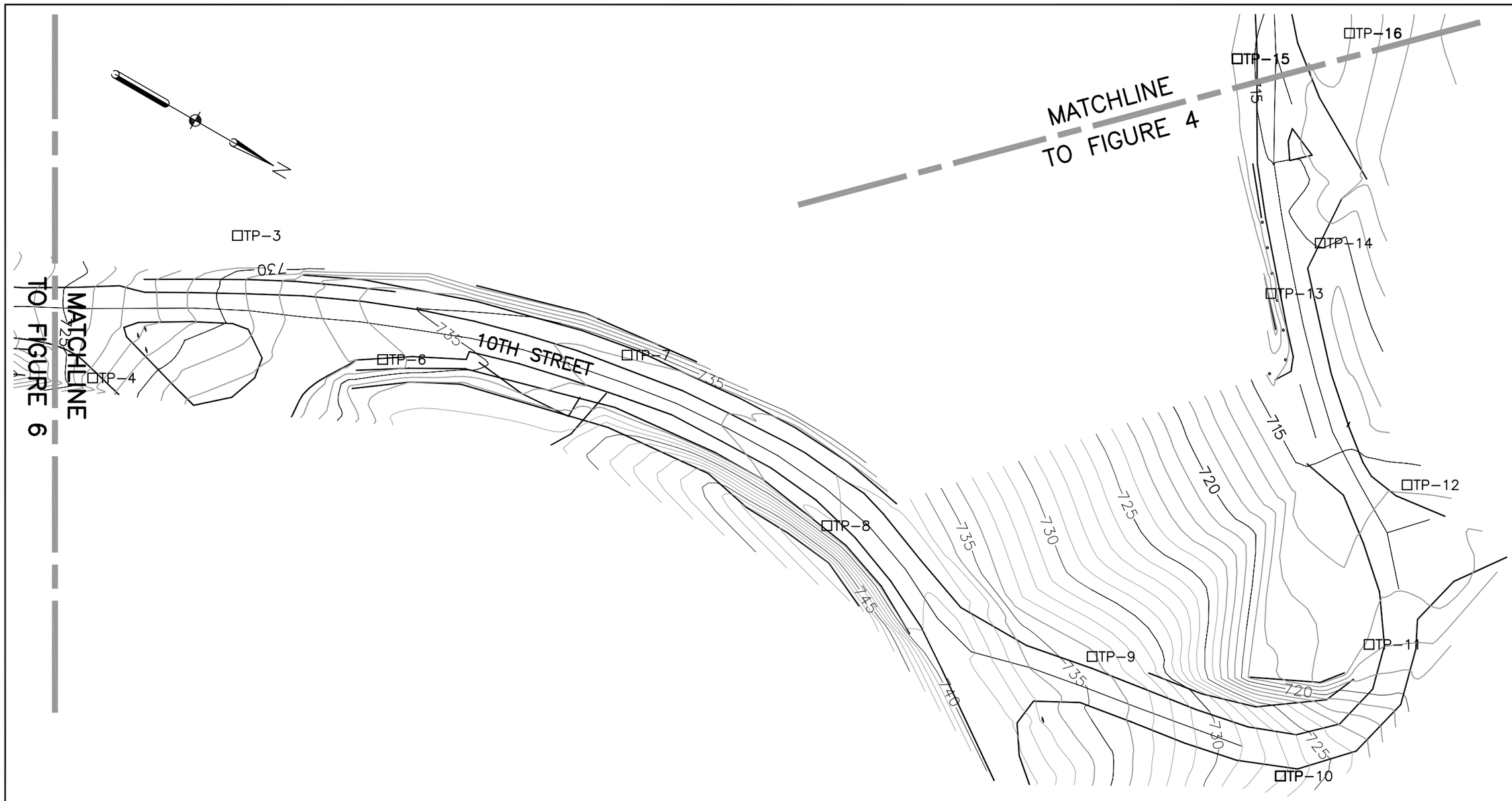
NOTE

1. SURVEY BY MEDINA CONSULTANTS, P.C., FEBRUARY 2004.
2. VERTICAL DATUM: NGVD 29

BORING AND TEST PIT LOCATION PLAN
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. FIG-4	PROJ. NO. 11655665
CK'D. BY	PM	DATE	FEB. 27, 2004	FIG. NO.	4



LEGEND

- ⊕ B-5 APPROXIMATE NUMBER AND LOCATION OF BORING
- □ TPB-2 APPROXIMATE NUMBER AND LOCATION OF TEST PIT

NOTE

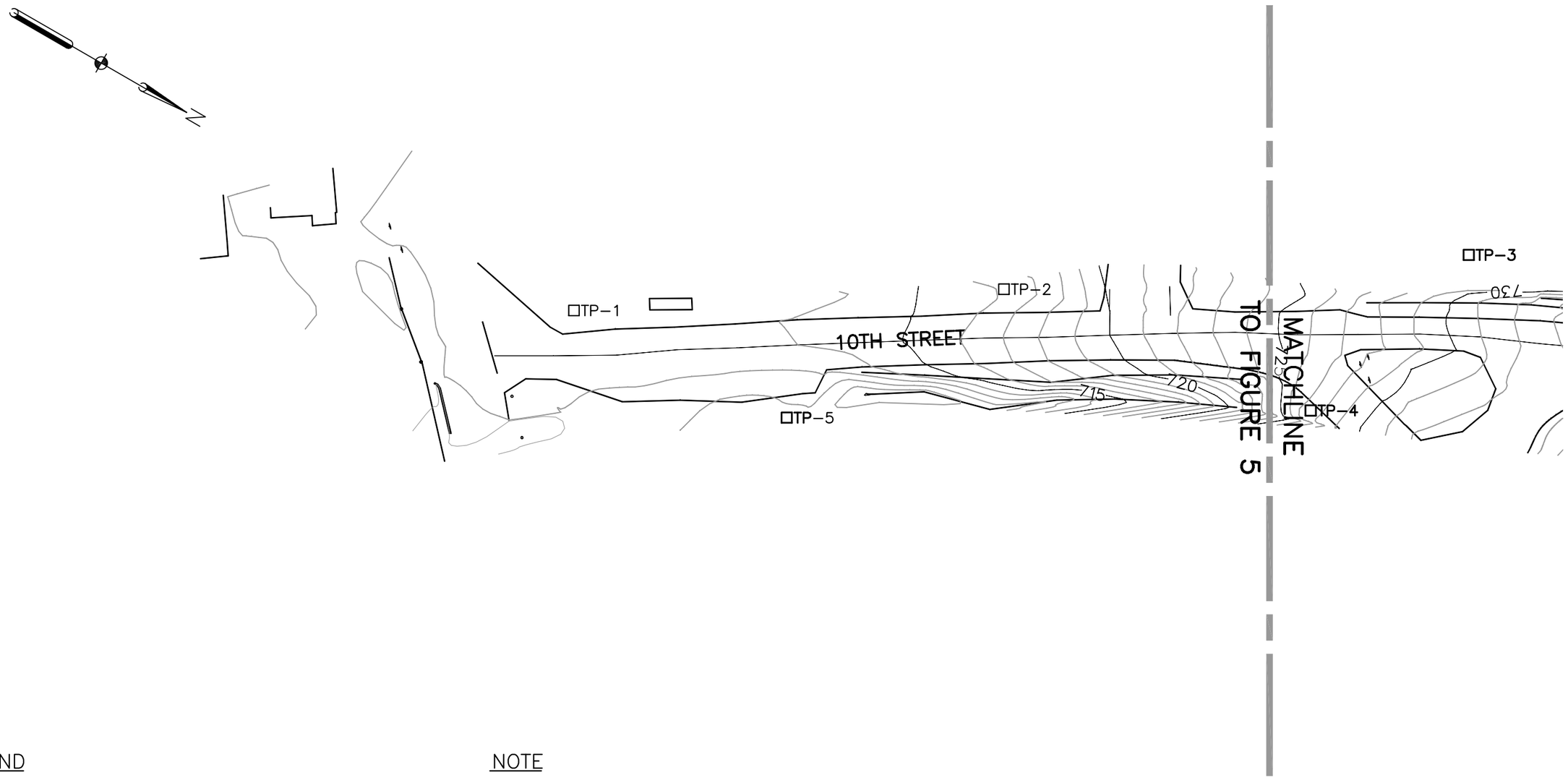
1. SURVEY BY MEDINA CONSULTANTS, P.C., FEBRUARY 2004.
2. VERTICAL DATUM: NGVD 29

0 25 50 100
SCALE (FEET)

BORING AND TEST PIT LOCATION PLAN
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. FIG-5	PROJ. NO. 11655665
CK'D. BY	PM	DATE	FEB. 27, 2004	FIG. NO.	5



LEGEND

- B-5 APPROXIMATE NUMBER AND LOCATION OF BORING
- TPB-2 APPROXIMATE NUMBER AND LOCATION OF TEST PIT

NOTE

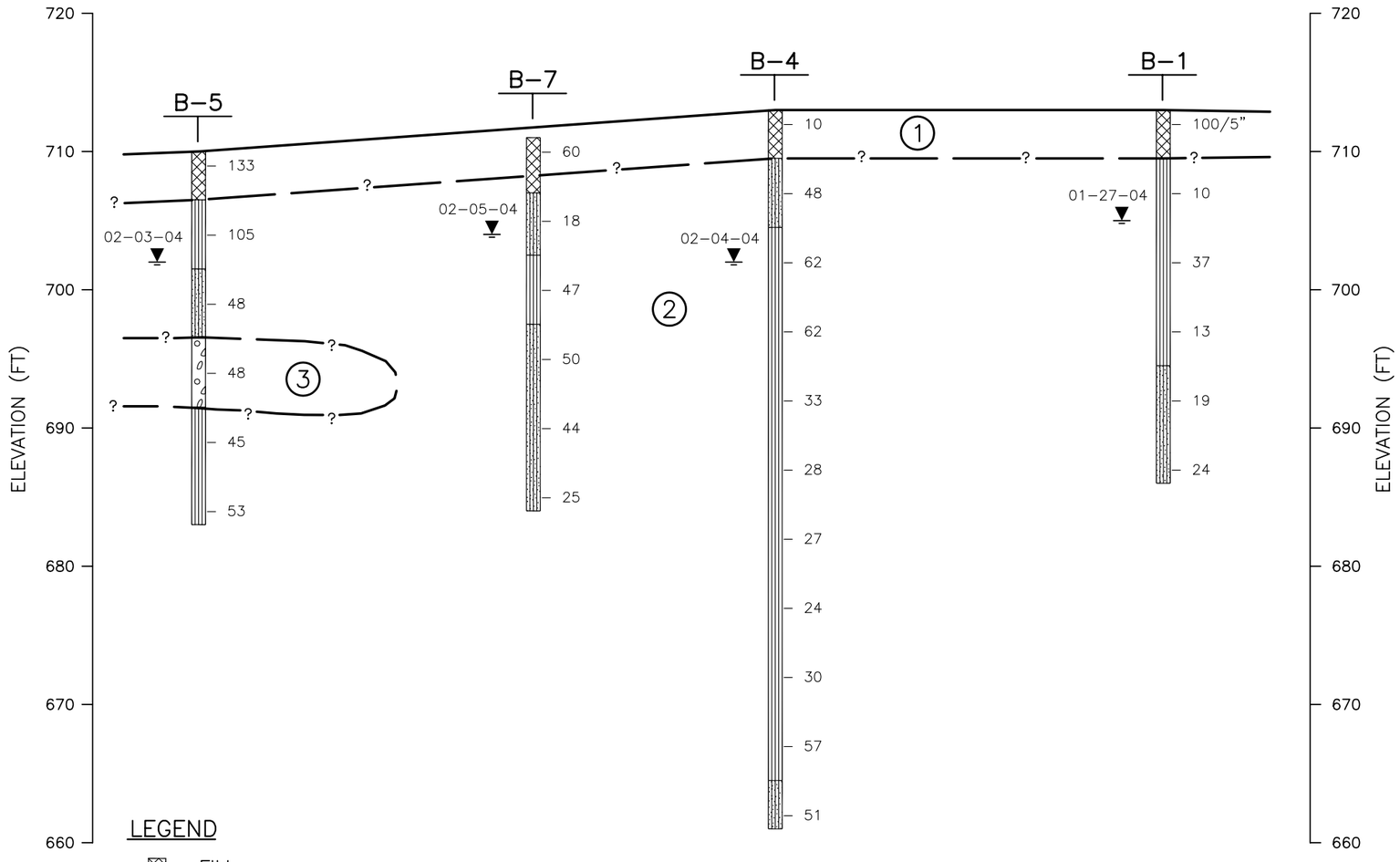
1. SURVEY BY MEDINA CONSULTANTS, P.C., FEBRUARY 2004.
2. VERTICAL DATUM: NGVD 29

0 25 50 100
SCALE (FEET)

BORING AND TEST PIT LOCATION PLAN
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. FIG-6	PROJ. NO. 11655665
CK'D. BY	PM	DATE	FEB. 27, 2004	FIG. NO.	6



LEGEND

- FILL
- SILT
- SILTY SAND
- POORLY–GRADED GRAVEL
- B–5 — NUMBER AND LOCATION OF BORING
- 47 — PENETRATION RESISTANCE (N–VALUE) FROM STANDARD PENETRATION TEST EXPRESSED IN BLOWS/FT
- 02–03–04 — APPROXIMATE WATER LEVEL AND DATE

GENERALIZED SUBSURFACE DESCRIPTIONS:

1. FILL: BROWN C–F SAND, WITH TRACE TO SOME GRAVEL AND SILT.
2. SAND/SILT: MEDIUM TO VERY DENSE OLIVE GRAY OR BROWN SILTY C–F SAND AND C–F SANDY SILT, WITH TRACE TO SOME CLAY AND GRAVEL AND OCCASIONAL BOULDERS.
3. GRAVEL: DENSE GRAVEL WITH SOME C–F SAND.

NOTES:

1. ELEVATIONS REFER TO NVGD 29 DATUM.
2. ELEVATIONS AND THICKNESSES OF SOIL STRATA BETWEEN BORINGS ARE ESTIMATED. STRATA BOUNDARIES ARE BASED ON INTERPRETATION OF BORINGS AND ARE SHOWN ONLY TO AID IN VISUALIZING GENERALIZED SUBSURFACE CONDITIONS. ACTUAL STRATA BOUNDARIES AND ELEVATIONS BETWEEN BORINGS MAY DIFFER FROM THE CONDITIONS SHOWN HEREIN.

0 50 100 200
HORIZONTAL SCALE (FEET)

0 5 10 20
VERTICAL SCALE (FEET)

GENERALIZED SUBSURFACE PROFILE A–A'
EXPLOSIVES R&D LOADING FACILITY
PICATINNY ARSENAL

URS
WAYNE, NEW JERSEY

DR. BY	ET	SCALE	AS SHOWN	DWG. NO. FIG–7–PROF	PROJ. NO. 11655665
CK'D. BY	PM	DATE	FEB. 27, 2004	FIG. NO.	7

APPENDIX A
TEST BORING LOGS & TEST PIT LOGS and PHOTOGRAPHS

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-1

Sheet 1 of 1

Date(s) Drilled	**1/27/04 - 1/27/04**	Logged By	**D. Ferreira**	Approximate Surface Elevation (feet)	**713.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770879 East: 474413**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) / Rock Depth (feet)	**27.0** / **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured	**8 1/27/04**	Hammer Wt/Drop / Casing Hammer Wt/Drop	**140 lb./30 in. Safety** / **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**12.4 ft. NW from the NW edge of 5th Avenue and 13.2 ft. SW from the service rd. S edge, as shown on the plan.**			No. of Samples	**Dist.: 6 Undist.:0 Core (ft):0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0	S-1	0.4	100/5"					(GP) Brown, dry,very dense, c-f sandy m-f GRAVEL, pieces of cobble. [Fill]					Length of casing = 10 ft.
5	S-2	1.0	5 5 5 10					(ML) Olive gray, moist, stiff, SILT, some c-f. sand, trace clay, f. gravel.			19	74	
10	S-3	0.2	6 15 22 20					(ML) Olive gray, wet, hard, SILT, some c-f sand, f. gravel.					
15	S-4	1.5	7 6 7 6					(ML) Brown, stiff, f.sandy SILT.			26	99	
20	S-5	2.0	5 9 10 11					(SM) Brown, medium dense, f. SAND, some silt.					
25	S-6	1.0	13 11 13 20					Same as Above.					
								End of boring @ 27 ft. BGS.					
30													

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-2

Sheet 1 of 1

Date(s) Drilled	**1/29/04 - 2/2/04**	Logged By	**D. Ferreira**	Approximate Surface Elevation (feet)	**717.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770920 East: 474388**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) / Rock Depth (feet)	**27.0** / **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured	**10 2/2/04**	Hammer Wt/Drop / Casing Hammer Wt/Drop	**140 lb./30 in. Safety** / **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**33 ft. SE from the NE corner of building 224, 6 ft. SW from the S edge of the service road, as shown on the plan.**			No. of Samples	**Dist.: 6 Undist.: 0 Core (ft): 0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0								4" Blacktop, 8" concrete.					Length of casing = 10 ft.
	S-1	1.0	27 29 7 8					(SM) Dark brown, dense, c-f SAND,some silt, trace f. gravel. [Fill]			13	17	
													Slow drilling, squicky noise, problem with the rig.
5	S-2	2.0	4 11 11 11					(SM) Light Brown, moist, medium dense, c-f SAND, some silt, trace f. gravel.					
10	S-3	1.0	4 15 17 10					(SM) Light brown, wet, dense, m-f SAND, some silt, trace c. sand, f. gravel.					End of work 1/29/04 Resumed drilling 2/2/04
15	S-4	0.0	15 17 17 17					No Recovery.					
20	S-5	0.4	6 16 12 12					(ML) Olive gray, hard f. sandy SILT.			24	91	
													Slow drilling, loud rig chatter.
25	S-6	0.4	6 15 10 20					(SP) Light brown, dense, c-f SAND, some m-f gravel.					
								End of boring @ 27 ft. BGS.					
30													

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-3

Sheet 1 of 1

Date(s) Drilled	**2/2/04 - 2/3/04**	Logged By	**D. Ferreira**	Approximate Surface Elevation (feet)	**717.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770710 East: 474148**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) / Rock Depth (feet)	**25.5** / **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured		Hammer Wt/Drop / Casing Hammer Wt/Drop	**140 lb./30 in. Safety** / **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**86 ft. SW from the NW corner of Building 216, 15 ft. NW from the NW edge of Phipps Rd., as shown on the plan.**			No. of Samples	**Dist.: 6 Undist.:0 Core (ft):0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0	S-1	0.5	9 8 11 13					(SP) Dark brown, medium dense, c-f SAND, some m-f gravel, trace silt. [Fill]					Length of casing = 10 ft. Casing installation was difficult.
													Rig chatter.
5	S-2	0.5	33 26 41 22					(SM) Light brown, moist, very dense, silty c-f SAND, trace f. gravel.					
10	S-3	1.0	8 8 32 28					(SM) Light brown, wet, dense, m-f SAND, some silt, c. sand, trace f. gravel.			10	30	
15	S-4	1.3	20 42 27 26					(SM) Brown, very dense, c-f SAND, some c-f gravel, silt.			10	23	
20	S-5	0.0	36 100/6"					No Recovery.					
								Boulder					Very difficult drilling, loud rig chatter, probable boulder from 21 to 23 ft.
25	S-6	0.0	100/4"					No Recovery.					
								End of boring @ 27 ft. BGS.					
30													

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-4

Date(s) Drilled	**2/4/04 - 2/4/04**	Logged By	**D. Ferreira**	Approximate Surface Elevation (feet)	**713.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770684 East: 474211**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) **52.0**	Rock Depth (feet) **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured	**11 2/4/04**	Hammer Wt/Drop **140 lb./30 in. Safety**	Casing Hammer Wt/Drop **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**56 ft. SW from the NE corner of Building 216, 8 ft. SE from the NW edge of 5th Avenue, as shown on the plan.**			No. of Samples	**Dist.: 11 Undist.: 0 Core (ft): 0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0	S-1	1.0	4 5 5 5					5 in. of Topsoil. (SM) Brown, medium dense, c-f SAND, some silt, trace m-f gravel, roots. [Fill]					Length of casing = 15 ft.
5	S-2	1.5	13 18 30 27					(SM) Light Brown, moist, dense, c-f SAND, some f. gravel, silt.			11	13	
10	S-3	1.0	15 34 28 23					(ML) Light brown, wet, hard, m-f sandy SILT, some c. sand, trace f. gravel.					Loud rig chatter from 12 to 13 ft, loss of water.
15	S-4	1.0	19 35 27 22					(ML) Gray, hard, m-f sandy SILT, some c. sand.					
20	S-5	1.0	13 16 17 28					(ML) Brown, hard, SILT, some f. sand.			22	96	
25	S-6	1.0	18 14 14 16					Same as above, very stiff.					
30													

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-4

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
30	S-7	1.7	8 9 18 19					(ML) Brown, very stiff, f. sandy SILT, trace clay.					
35	S-8	2.0	8 11 13 17					Same as above.					
40	S-9	1.5	9 14 16 30					Same as above.			26	99	
45	S-10	1.5	17 30 27 30					Same as above, hard.					
50	S-11	1.0	64 34 17 13					(SM) Brown, very dense, silty c-f SAND, some silt.					Rig chatter.
								End of boring @ 52 ft. BGS.					
55													
60													
65													

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-5

Sheet 1 of 1

Date(s) Drilled	**2/3/04 - 2/3/04**	Logged By	**D. Ferreira**	Approximate Surface Elevation (feet)	**710.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770394 East: 473911**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) / Rock Depth (feet)	**27.0** / **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured	**8 2/3/04**	Hammer Wt/Drop / Casing Hammer Wt/Drop	**140 lb./30 in. Safety** / **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**21 ft. SW from the SE corner of Building 215, 2.5 ft. SE from the NW edge of 5th Avenue, as shown on the plan.**			No. of Samples	**Dist.: 6 Undist.:0 Core (ft):0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0	S-1	1.0	39 79 54 63					(SM) Dark brown, dry, very dense, c-f SAND, some silt, m-f gravel.					
5	S-2	1.0	4 47 58 43					(ML) Light gray, moist, hard, SILT, some c-f sand, trace f. gravel, clay.			17	48	
10	S-3	1.0	12 26 22 18					(SM) Light brown, wet, dense, c-f SAND, some silt, trace f. gravel.			11	42	
15	S-4	0.5	15 18 30 27					(GP) Light brown, dense, c-f GRAVEL, some c-f sand.					Rig chatter.
20	S-5	1.5	30 25 20 34					(ML) Brown , hard SILT, some f. SAND.			25	98	
25	S-6	0.3	15 19 34 50					(ML) Brown, hard, c-f sandy SILT, some c-f gravel.					
30								End of boring @ 27 ft. BGS.					

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-6

Sheet 1 of 1

Date(s) Drilled	**2/5/04 - 2/5/04**	Logged By	**D. Ferreira**	Approximate Surface Elevation (feet)	**716.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770452 East: 473862**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) **27.0**	Rock Depth (feet) **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured	**7 2/5/04**	Hammer Wt/Drop **140 lb./30 in. Safety**	Casing Hammer Wt/Drop **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**13.7 ft. SW from the SW corner of Building 215, 4 ft NW from the W edge of the Phipps Rd., as shown on the plan.**			No. of Samples	**Dist.: 6 Undist.:0 Core (ft):0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0	S-1	1.0	11 10 20 27					(SM) Dark brown, dry, dense, c-f SAND, some silt, c-f gravel. [Fill]					Length of casing = 10 ft.
													Rig chatter.
5	S-2	1.0	11 18 52 65					(SM) Reddish Brown, moist, very dense, silty m-f SAND, some c-f gravel, clay.			8	18	
10	S-3	1.0	28 17 36 4					(ML) Brown, wet, hard, SILT, some f. sand, clay, trace c. sand.			19	67	
15	S-4	1.0	18 14 22 31					(SM) Yellow Brown, dense, silty m-f SAND, some c. sand.					
20	S-5	0.5	18 17 22 23					(SM) Yellowish Brown, dense, c-f SAND, some c-f gravel, trace silt.					
25	S-6	0.5	26 49 100/1"					(SM) Yellowish Brown, very dense, c-f SAND, some f. gravel, trace silt.					
								End of boring @ 27 ft. BGS.					
30													

Project: Explosive R&D Loading Facility
Project Location: Picatinny Arsenal, Dover, NJ
Project Number: 11655665

Log of Boring B-7

Sheet 1 of 1

Date(s) Drilled	**2/5/04 - 2/5/04**	Logged By	**D.Ferreira**	Approximate Surface Elevation (feet)	**711.0**
Drilling Method	**Mud Rotary**	Drilling Contractor	**Jersey Boring and Drilling Company, Inc.**	Coordinates	**North: 770575 East: 474073**
Casing Size/Type	**4" Steel**	Drill Rig Operator	**Carlos Tirado**	Total Depth Drilled (feet) / Rock Depth (feet)	**27.0** / **n/e**
Drill Rig Type	**Acker CME 39**	Drill Bit Size/Type	**3-7/8" Tricone**	Sampler Type(s)	**2 in. O.D. Split Spoon**
Groundwater Level and Date Measured	**7 2/5/04**	Hammer Wt/Drop / Casing Hammer Wt/Drop	**140 lb./30 in. Safety** / **300 lb./24 in.**	Core Barrel Size/Type	**n/a**
Boring Location and Comments	**36 ft. SW from the SE corner of building 216, 36 ft. SE from the NW edge of 5th Avenue, as shown on the plan.**			No. of Samples	**Dist.: 6 Undist.: 0 Core (ft): 0**

Depth, feet	Soil Samples: Type, Number	Recov. (ft)	Pen. Resist. (blows/6 in)	Rock Coring: Run Number	Recov. (%)	RQD (%)	Graphic Log	MATERIAL DESCRIPTION	Liquid Limit	Plastic Limit	Water Cont.(%)	% Fines	REMARKS/ OTHER TESTS
0	S-1	1.0	10 28 32 12					(SM) Dark brown, very dense, c-f SAND, some m-f gravel, silt. [Fill]			13	15	Length of casing = 10 ft.
													Rig chatter.
5	S-2	0.3	8 7 11 26					(SM) Brown, wet, medium dense, silty m-f SAND, trace c. sand.					
10	S-3	1.0	8 22 25 20					(ML) Yellow-brown, hard, SILT, some f. sand, clay, trace f. gravel, c. sand.			13	46	
15	S-4	0.4	14 20 30 17					(SM) Brown, very dense, silty c-f SAND, some m-f gravel.					
20	S-5	0.6	10 24 20 22					(SM) Brown, dense, c-f SAND, some m-f gravel, silt.					
25	S-6	0.2	7 11 14 17					(SM) Brown, medium dense, silty c-f SAND.					
								End of boring @ 27 ft. BGS.					
30													

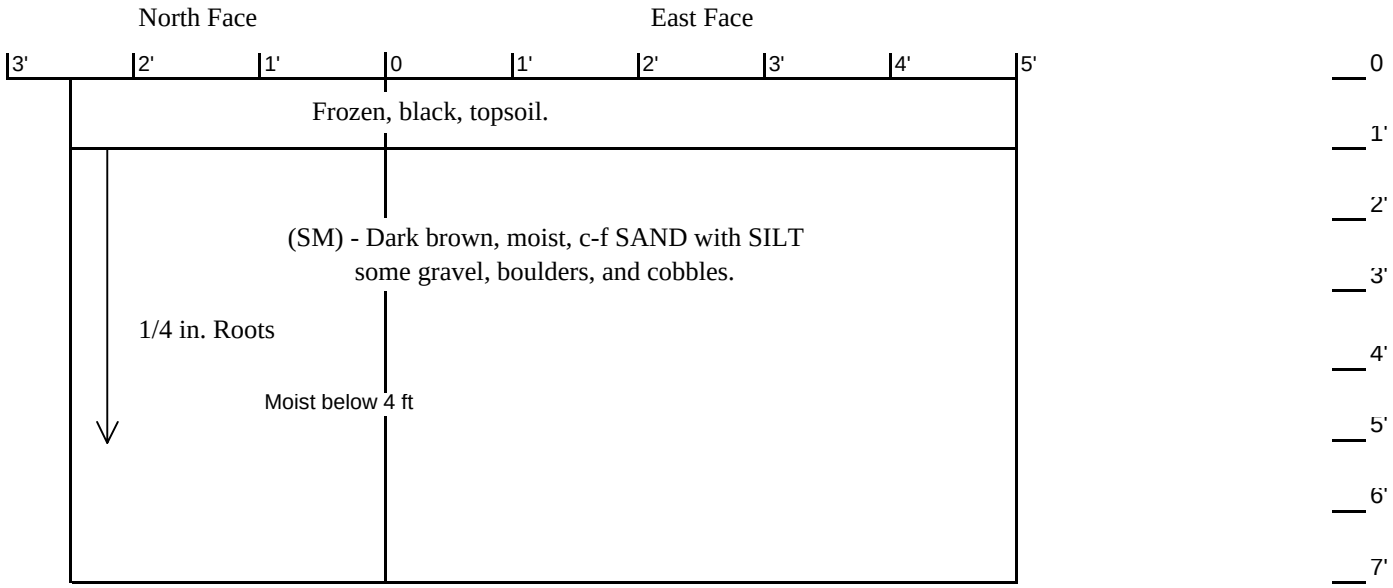
URS

LOG OF TEST PIT TP-1

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 713.5 ft.	COMPLETION DEPTH: 7 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 5 ft. x 2.5 ft. x 7 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



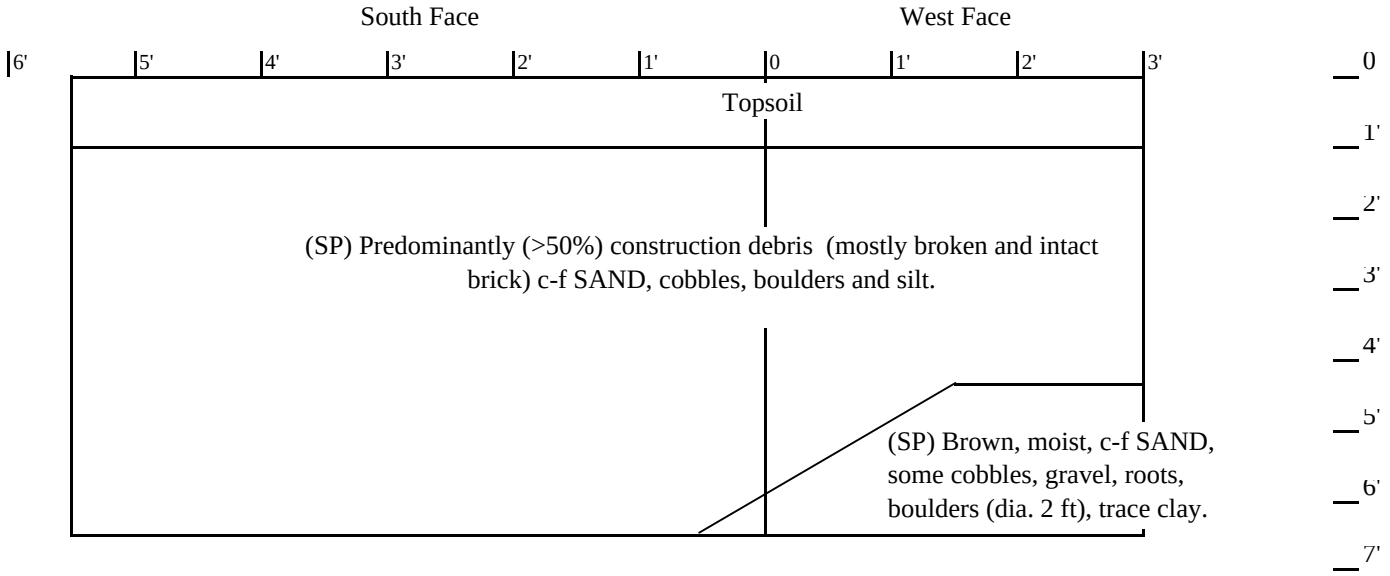
URS

LOG OF TEST PIT TP-2

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 6.5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 5.5 ft. x 3 ft. x 6.5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Foot of 10th Street at Reily Avenue, as shown on the test pit loction plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



URS

LOG OF TEST PIT TP-3

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 725	COMPLETION DEPTH: 6.5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 3 ft. x 6.5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Toe of road embankment, west of 10th Avenue, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)

West Face

7' 6' 5' 4' 3' 2' 1' 0

North Face

0 1' 2' 3'

(SP) Dark brown c-f SAND, some gravel, silt, construction debris, steel rods, boulders, trace gravel, and cobbles.

(SP) Reddish brown c-f SAND, trace silt, c-f gravel, cobbles.

Very weathered (decomposed) fractured gray, GNEISS, heavily iron stained, breaks with hand pressure.

1' 2' 3' 4' 5' 6' 7'

URS

LOG OF TEST PIT TP-4

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility		APPROXIMATE GROUND SURFACE ELEVATION (FT): 727.5 ft.	COMPLETION DEPTH: 6.5 ft.	PROJECT NUMBER: 11655665
LOCATION: Picatinny Arsenal, Dover, NJ				
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 2 ft. x 6.5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: East of 10th Street at intersection with 20th Avenue, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)
East Face / South Face 7' 6' 5' 4' 3' 2' 1' 0 1' 2'	0
(ML) Dark brown and black SILT, some c-f sand, gravel, live roots.	1'
	2'
(SM) Reddish brown m-f SAND, some silt, c-f gravel, cobbles, trace clay.	3'
	4'
	5'
	6'
Hard, possibly rock, breaks with backhoe pressure, but not easily.	7'

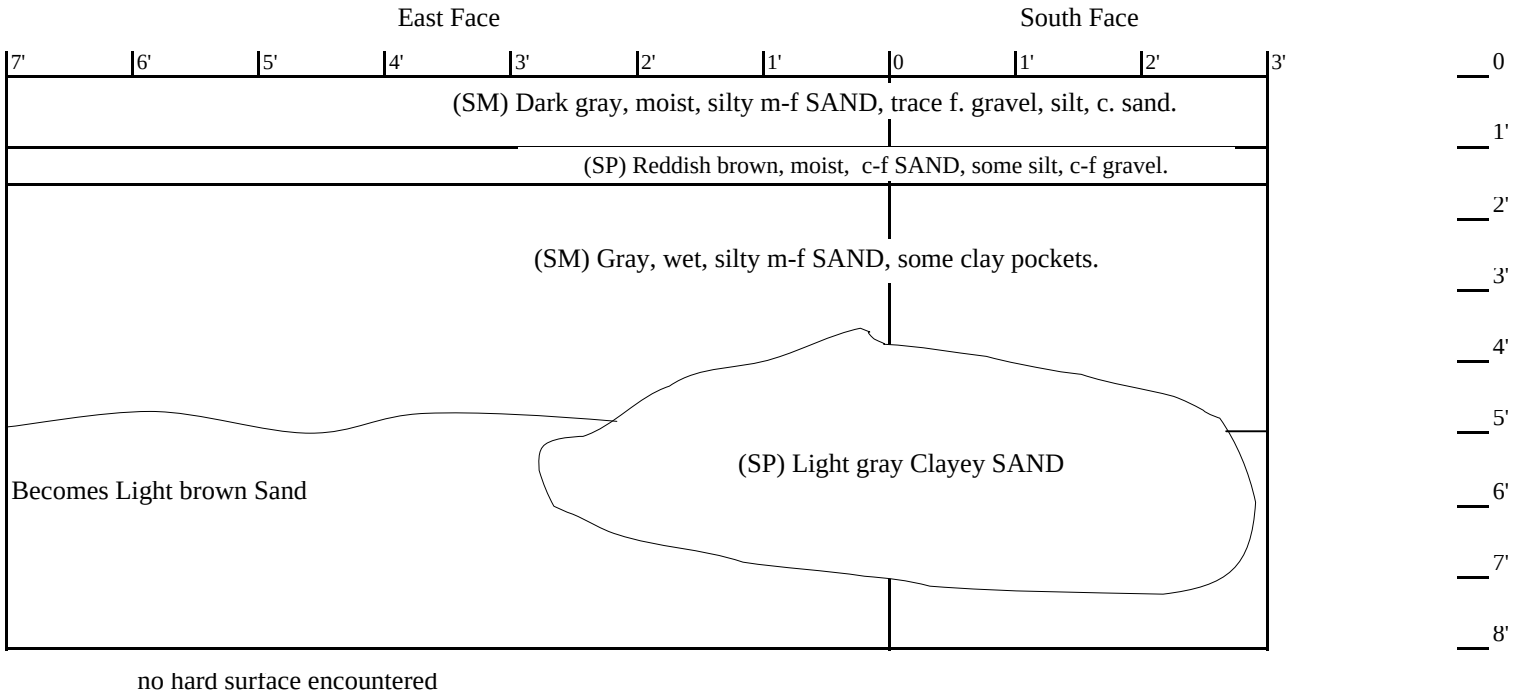
URS

LOG OF TEST PIT TP-5

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 712	COMPLETION DEPTH: 8 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 3 ft. x 7 ft. x 8 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): water trickles in around 4ft	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description | Depth (ft)



no hard surface encountered

URS

LOG OF TEST PIT TP-6

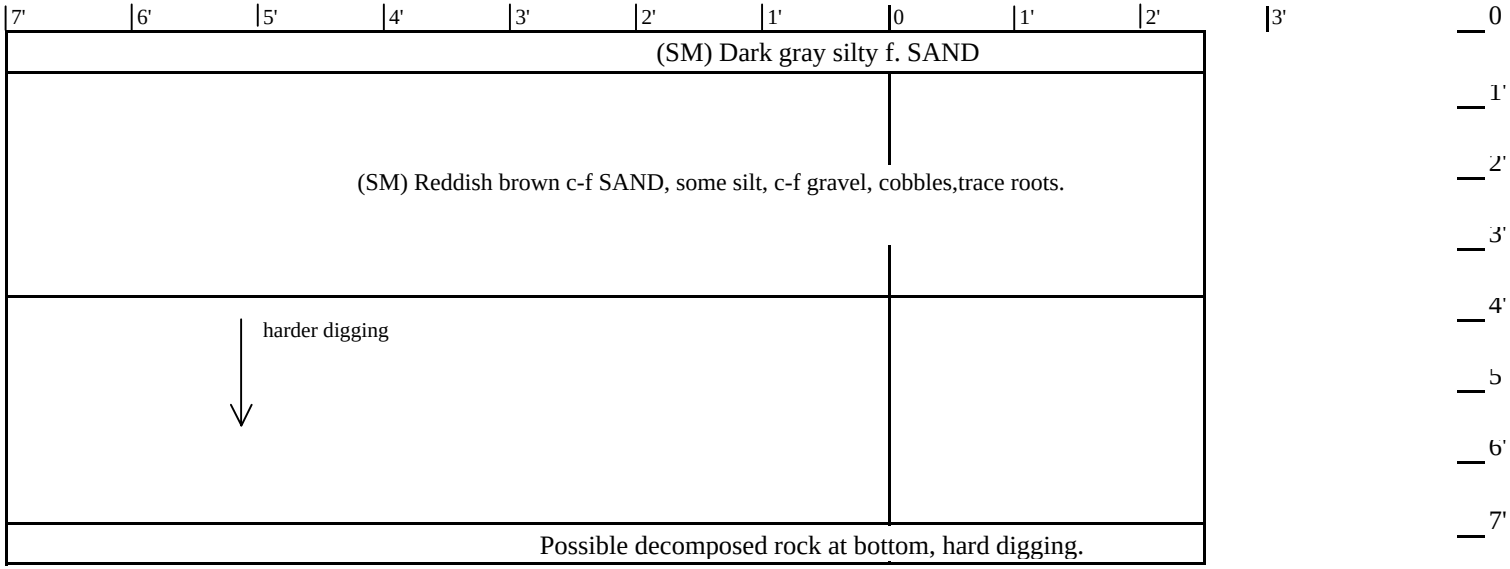
SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 734	COMPLETION DEPTH: 7.5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 2.5 ft. x 7.5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)

West Face

North Face



URS

LOG OF TEST PIT TP-7

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 736	COMPLETION DEPTH: 7 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 2 ft. x 7 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Across the street from a monitoring well, on embankment, 5-10ft from asphalt, as shown on the test pit plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)
West Face / North Face 7ft 6ft 5ft 4ft 3ft 2ft 1ft 0ft 1ft 2ft	0
Roots.	1'
(SM) Reddish brown c-f SAND, some silt, trace c-f gravel, cobbles, some broken weathered rock pieces, trace clay.	2' 3' 4' 5'
Broke through 1-1.5 ft. of decomposed soft rock.	6'
Hard Bottom.	7'

URS

LOG OF TEST PIT TP-8

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 738	COMPLETION DEPTH: 1.5 ft	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 6ft x 2ft x 1.5ft
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan; at toe of steep rock slope.				HORIZONTAL SCALE: NTS

Description	Depth (ft)
West Side	
6' 5' 4' 3' 2' 1'	0
(SP) Gray and brown c-f SAND, trace silt, c-f gravel	
Weathered, decomposed GNEISS (Losee formation)	1'
Could not break rock beyond 1.5 ft.	2'

North Face

0 1' 2'

Fractured Gneiss, decomposed.

i:\projects\11655665(Picatinny)\TP Series

URS

LOG OF TEST PIT TP-9

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 734	COMPLETION DEPTH: 7 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 2.5 ft. x 7 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)
East Face / South Face	
7' 6' 5' 4' 3' 2' 1' 0 1' 2' 3'	0
(ML) Dark brown to brown SILT, some c-f SAND, c-f gravel, few cobbles, trace clay.	1'
Roots	2'
	3'
(SM) Brown c-f SAND, some silt, c-f gravel, cobbles, fewer roots, trace clay.	4'
	5'
	6'
	7'

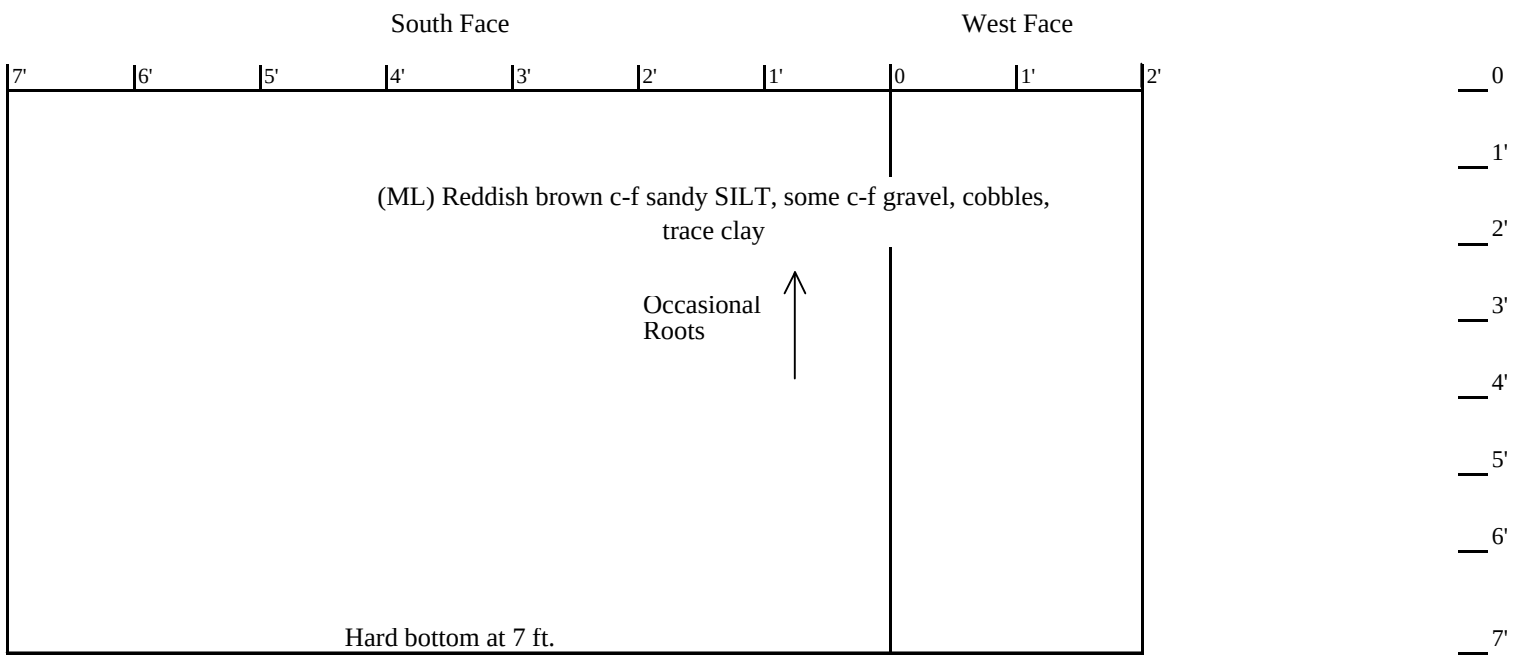
URS

LOG OF TEST PIT TP-10

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 727	COMPLETION DEPTH: 7 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 22, 2004	DATE COMPLETED: January 22, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 2 ft. x 7 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



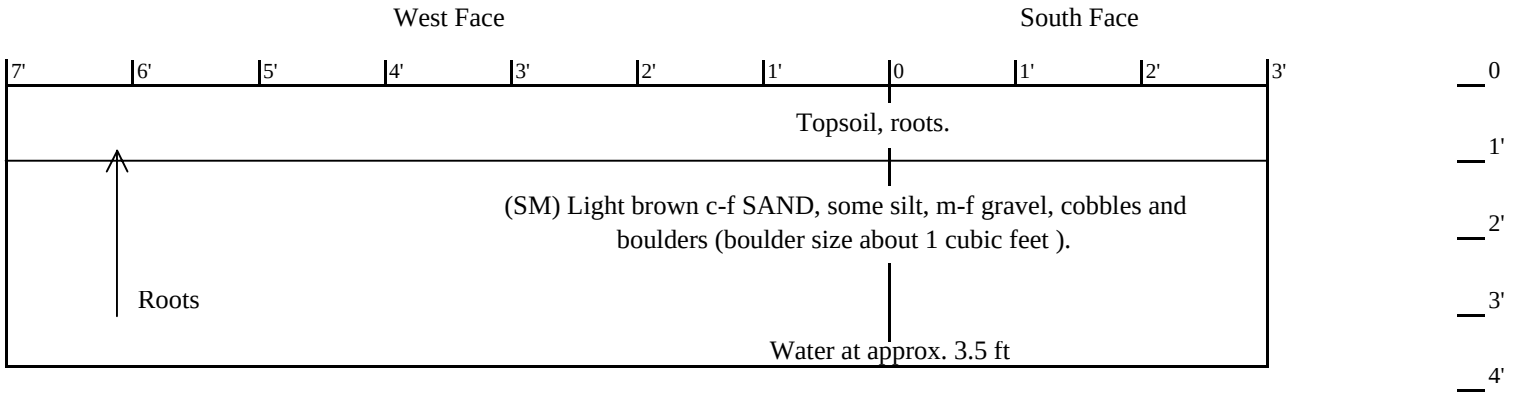
URS

LOG OF TEST PIT TP-11

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 717	COMPLETION DEPTH: 4 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 3 ft. x 4 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 3.5 ft	INSPECTOR: D. Ferreira	VIEW
EXCAVATION LOCATION: South of building # 232 by the intersection of the roads, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



URS

LOG OF TEST PIT TP-12

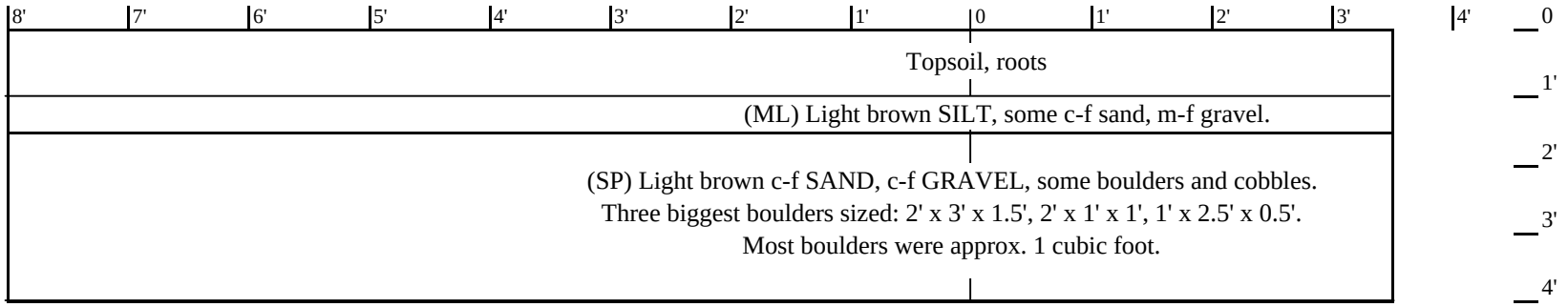
SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3.5 ft. x 5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4 ft.	INSPECTOR: D. Ferreira	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)

West Face

South Face



Water at 4 ft.

Note: Hole caved in at 4 ft.

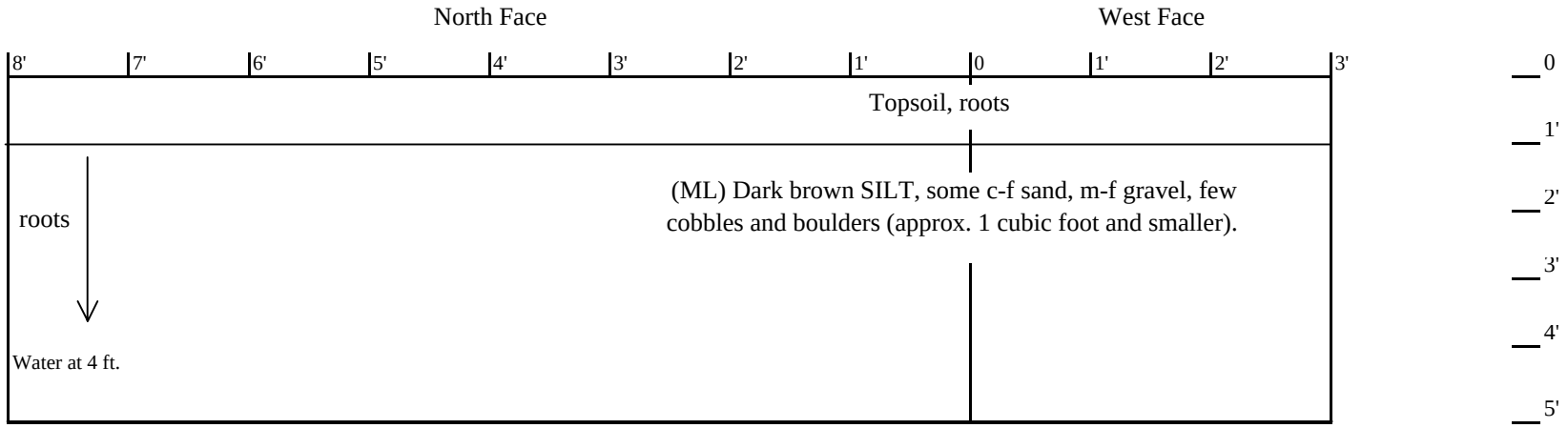
URS

LOG OF TEST PIT TP-13

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 715 ft. (approx.)	COMPLETION DEPTH: 5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4 ft.	INSPECTOR: D. Ferreira	VIEW:
EXCAVATION LOCATION: As shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



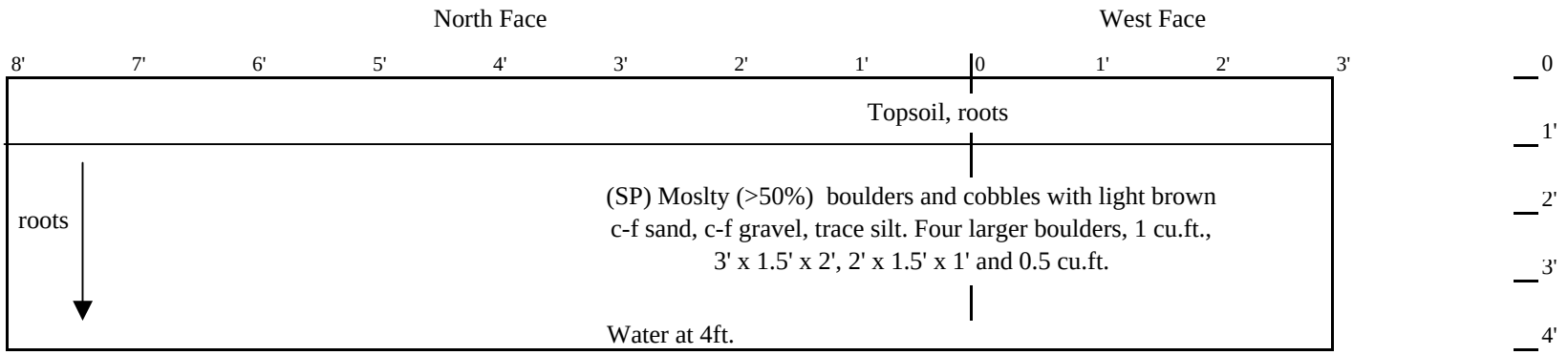
URS

LOG OF TEST PIT TP-14

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 715	COMPLETION DEPTH: 4 ft	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8ft x 3ft x 4ft
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4 ft	INSPECTOR: D. Ferreira	VIEW:
EXCAVATION LOCATION				HORIZONTAL SCALE: NTS

Description	Depth (ft)



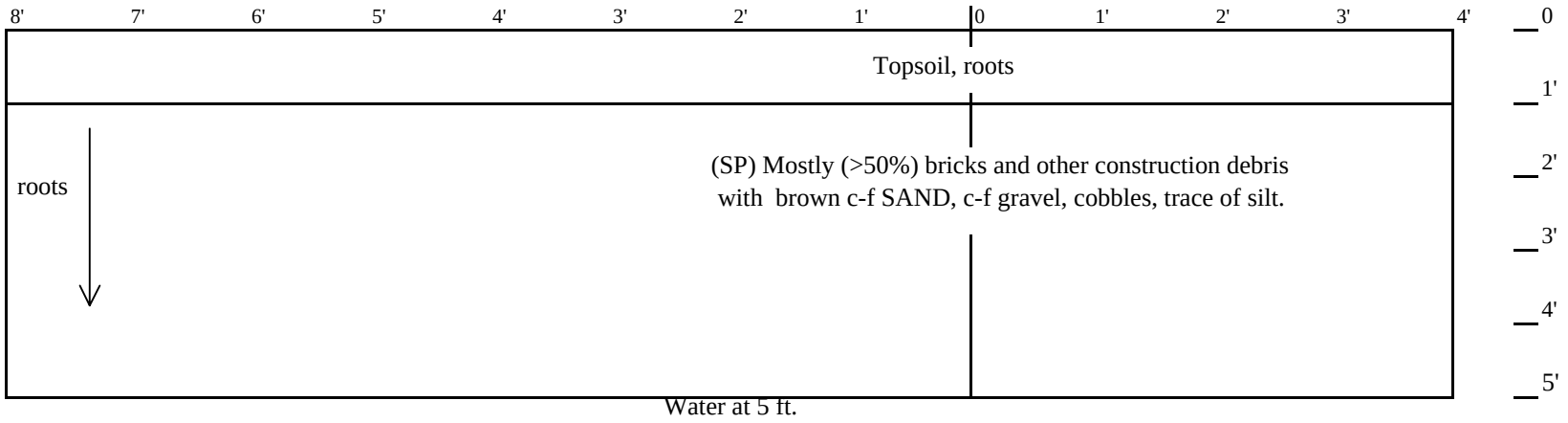
URS

LOG OF TEST PIT TP-15

SHEET 1 OF 1

PROJECT NAME		APPROXIMATE GROUND SURFACE ELEVATION (FT)	COMPLETION DEPTH	PROJECT NUMBER
Explosives R&D Loading Facility		714	5 ft.	11655665
LOCATION				
Picatinny Arsenal, Dover, NJ				
EXCAVATION CONTRACTOR	FOREMAN	DATE STARTED	DATE COMPLETED	APPROX. DIMENSIONS (FT) L x W x D
Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	Mike Huber	January 30, 2004	January 30, 2004	8 ft. x 4 ft. x 5 ft.
EXCAVATION EQUIPMENT		APPROXIMATE DEPTH TO WATER LEVEL (FT)	INSPECTOR	VIEW
CAT 430D		5 ft.	D. Ferreira	
EXCAVATION LOCATION				HORIZONTAL SCALE
South between buildings 225 and 230, next to the swamp, as shown on the test pit location plan.				NTS

Description	Depth (ft)



URS

LOG OF TEST PIT TP-16

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 715	COMPLETION DEPTH: 5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 5 ft.	INSPECTOR: D. Ferreira	VIEW:
EXCAVATION LOCATION: South between buildings 225 and 230, 10 ft North from the edge of the road, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)
North Face 8' 7' 6' 5' 4' 3' 2' 1' 0 / West Face 0 1' 2' 3'	
Topsoil, roots	0
(SP) Brown c-f SAND, some m-f gravel, trace of cobbles and boulders.	1'
(ML) Light Brown SILT, some c-f SAND, m-f gravel.	2'
(SP) Brown c-f SAND, some m-f gravel, trace of cobbles and boulders. (sized approx. 1 cubic foot or less)	3'
Water at 5 ft.	4'
	5'

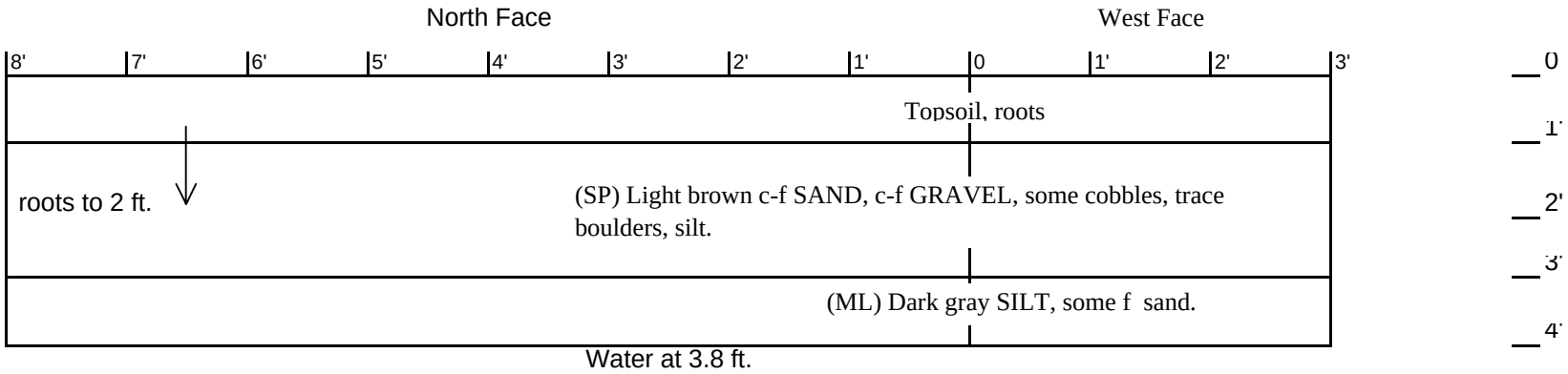
URS

LOG OF TEST PIT TP-17

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 713	COMPLETION DEPTH: 4 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 4 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 3.8 ft.	INSPECTOR: D. Ferreira	VIEW:
EXCAVATION LOCATION: South of Building 225, next to the swamp, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



URS

LOG OF TEST PIT TP-18

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 715	COMPLETION DEPTH: 5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 30, 2004	DATE COMPLETED: January 30, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 4 ft. x 5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4.5	INSPECTOR: D. Ferreira	VIEW:
EXCAVATION LOCATION: South of Building 225, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description | Depth (ft)

North Face: 7' 6' 5' 4' 3' 2' 1' 0

West Face: 0 1' 2' 3' 4'

0 — Topsoil, roots

1' — (SP) Reddish brown, c-f SAND, some c-f gravel, brick. [Fill]

2' — (SP) Brown, c-f SAND, some c-f gravel, trace cobbles and boulders (1 cubic foot or smaller)

4' — Bottom of Testpit filling with water.

5'

Note: Test Pit caved in at 5 ft.

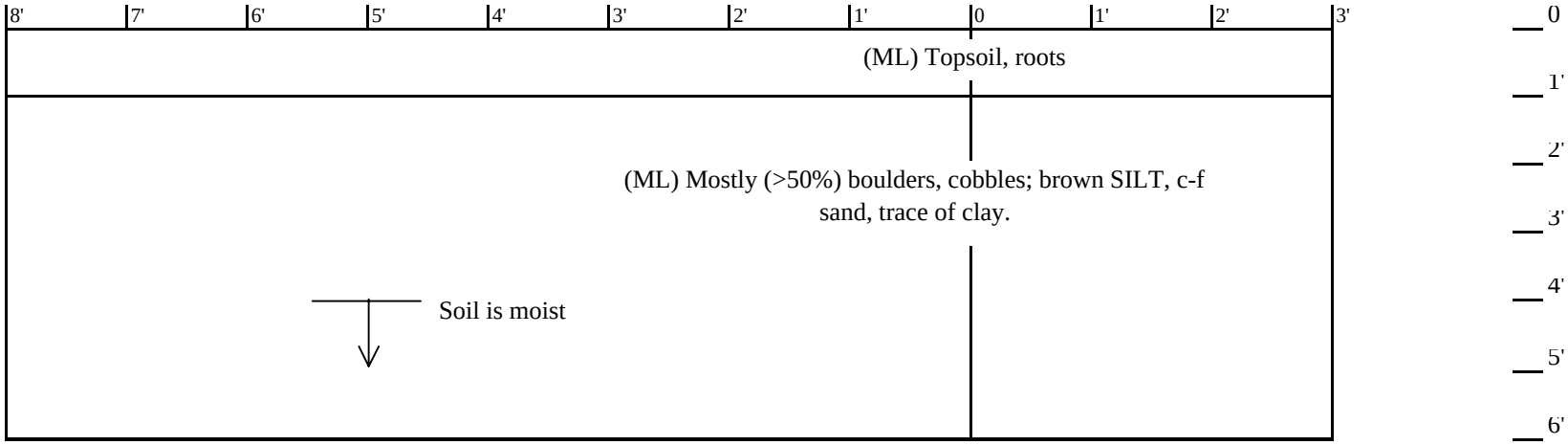
URS

LOG OF TEST PIT TPB-1

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 6 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 6 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW
EXCAVATION LOCATION: Near building # 216, NE Corner, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description | Depth (ft)



URS

LOG OF TEST PIT TPB-2

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 712	COMPLETION DEPTH: 7.5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 7.5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 7.5	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Near the NE corner of building # 215, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

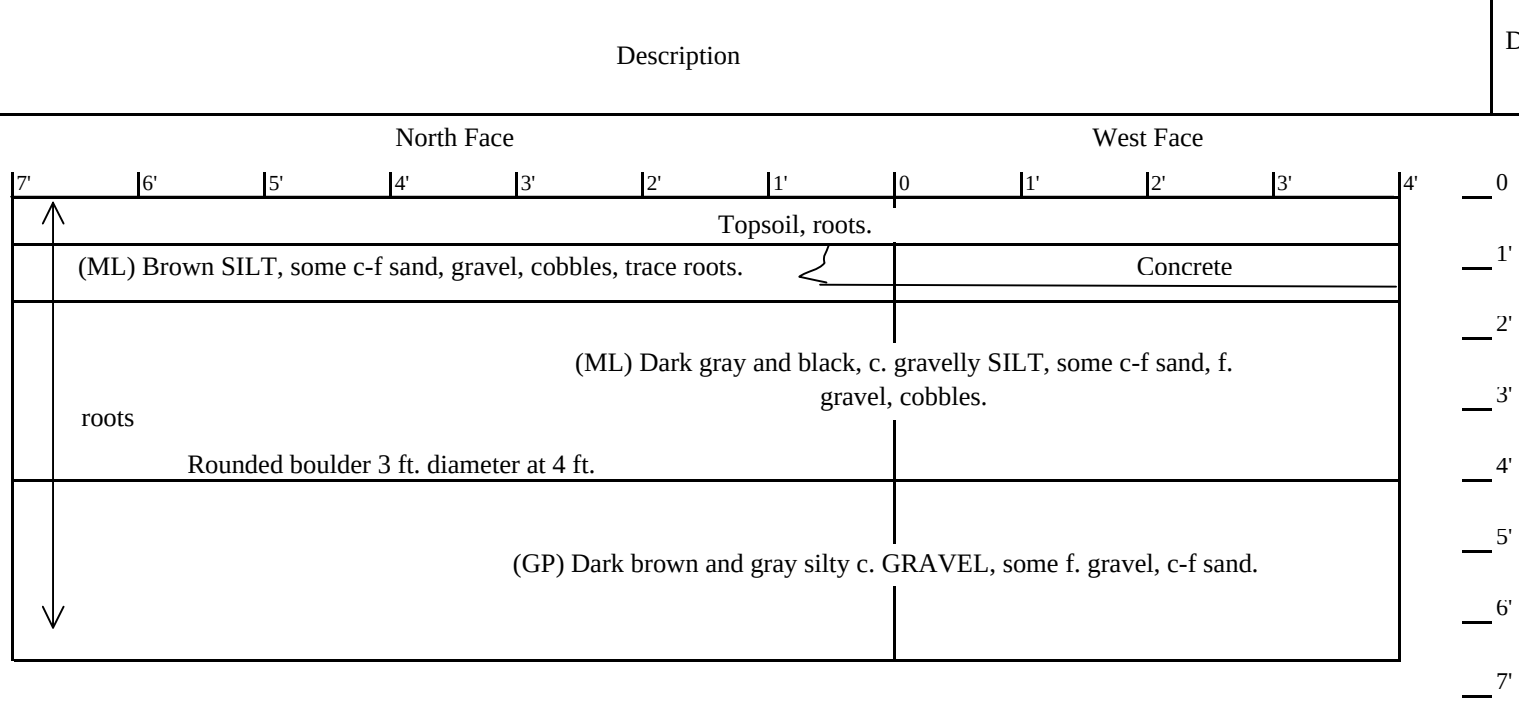
Description	Depth (ft)
West Face 8' 7' 6' 5' 4' 3' 2' 1' 0 / North Face 0 1' 2' 3'	
Topsoil, 2-3 Boulders, roots	0
(SP) Light Brown m-f SAND,trace silt, c-f gravel, cobbles. [Fill]	1'
	2'
(ML) Dark brown SILT, some c-f SAND, trace clay. Several 1 to 2 ft. angular boulders.	3'
	4'
	5'
	6'
(ML) Dark gray and black SILT, some c-f sand, few boulders.	7'
Water accumulates at bottom.	8'

URS

LOG OF TEST PIT TPB-3

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 6.5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 4 ft. x 6.5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Near NW corner of building # 215, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS



Description

Depth (ft)

URS

LOG OF TEST PIT TPB-4

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 717	COMPLETION DEPTH: 6 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 3 ft. x 6 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Near NW corner of building # 216, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)

North West Face — North East Face

7' 6' 5' 4' 3' 2' 1' 0 1' 2' 3'

(ML) Brown, gray topsoil, SILT, c-f sand, roots

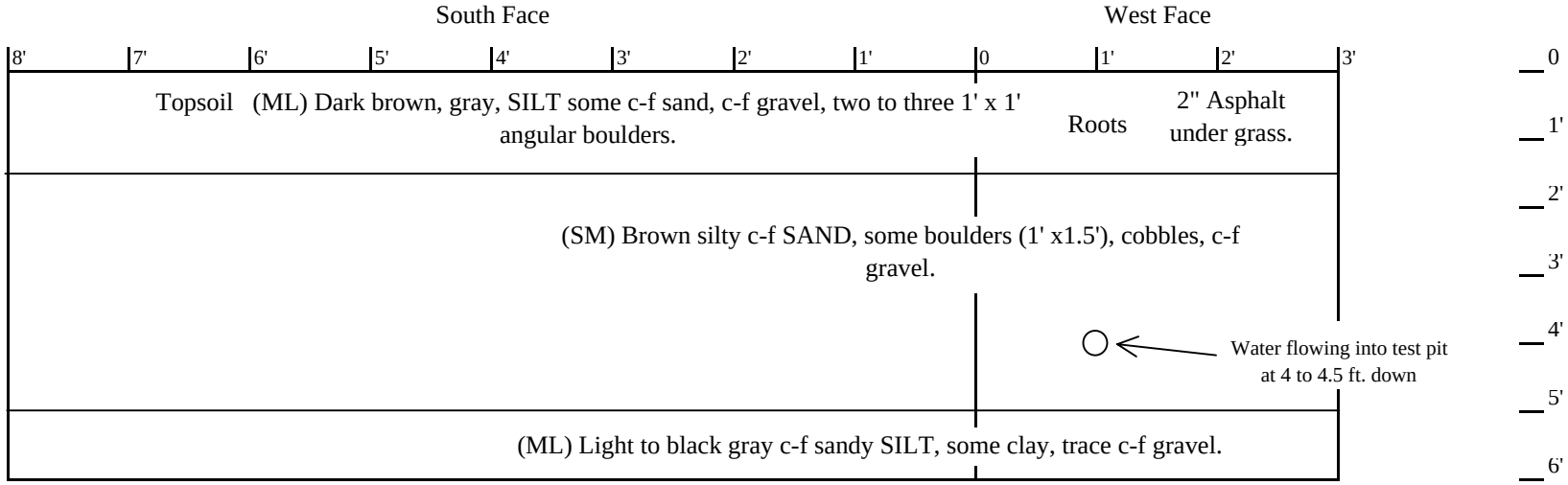
(ML) Reddish brown SILT, some c-f SAND, c-f gravel, trace clay. Several rounded cobbles, boulders. Three to four Boulders >1.5 ft. One Boulder 2' x 1' x 3.5'

0
1'
2'
3'
4'
5'
6'

URS

LOG OF TEST PIT TPB-5

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 713	COMPLETION DEPTH: 6 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 6 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4.5	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Near SE corner of building # 215, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS



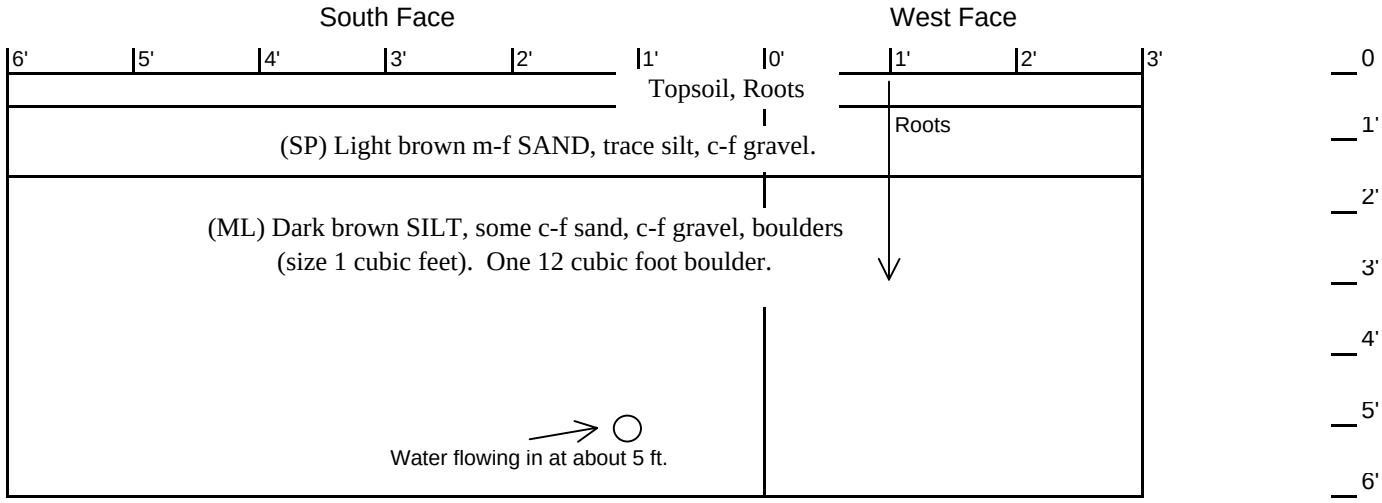
URS

LOG OF TEST PIT TPB-6

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 712	COMPLETION DEPTH: 6 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 6 ft. x 3 ft. x 6 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 5	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Between building # 215 and #216, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description | Depth (ft)



URS

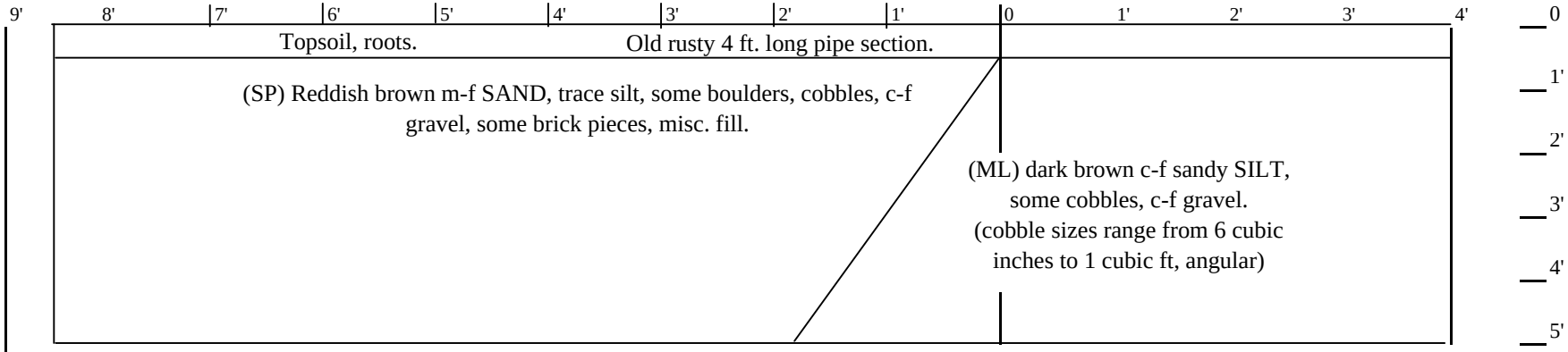
LOG OF TEST PIT TPB-7

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8.5 f. x 4 ft. x 5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/E	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Near SW wall of building # 216, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description | Depth (ft)

East Face



South Face

Note: Hole caves in when going deeper than 5 ft.

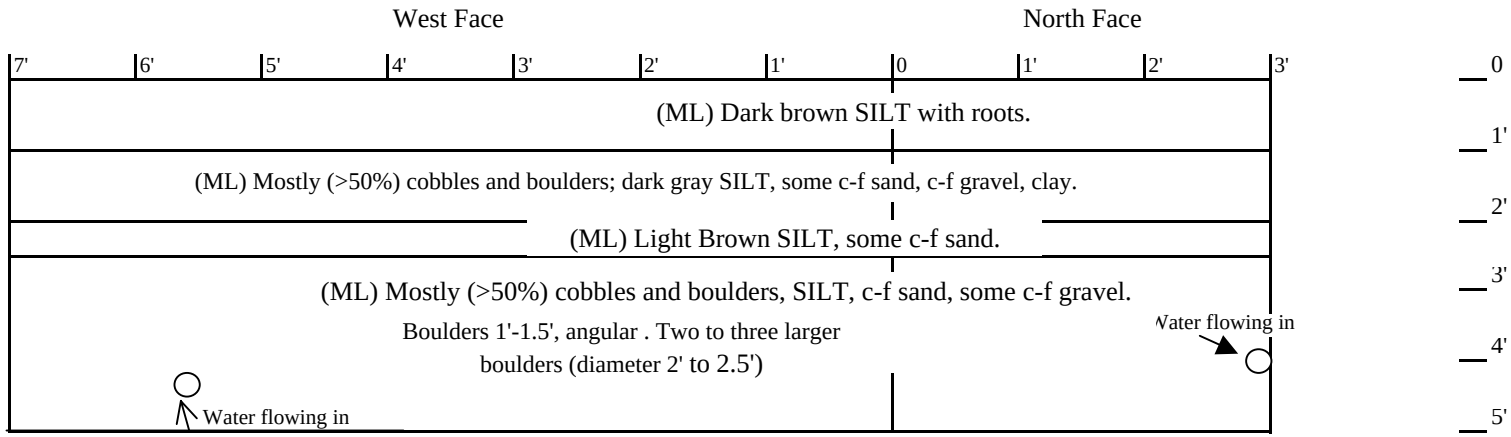
URS

LOG OF TEST PIT TPB-8

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 713	COMPLETION DEPTH: 5 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: January 23, 2004	DATE COMPLETED: January 23, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 3 ft. x 5 ft.
EXCAVATION EQUIPMENT: CAT 430D		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4	INSPECTOR: P. Matheos	VIEW:
EXCAVATION LOCATION: Near NE wall of the building # 216, as shown on the test pit location plan.				HORIZONTAL SCALE: NTS

Description	Depth (ft)



URS

LOG OF TEST PIT TPB-9

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 714	COMPLETION DEPTH: 10 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 03, 2004	DATE COMPLETED: May 03, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 10 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): 9	INSPECTOR: Chang Oh	VIEW:
EXCAVATION LOCATION:				HORIZONTAL SCALE: NTS

Description	Depth (ft)
South Face: 8' 7' 6' 5' 4' 3' 2' 1' 0	0
(SP) Dark brown, coarse to fine SAND with cobbles and boulders, roots.	
Largest encountered boulders were 3 ft. x 1.5 ft. x 1 ft. and 2 ft. x 2 ft. x 1 ft.	1'
Approximately 40%-50% boulders and cobbles.	2'
	3'
(SP) Light brown, coarse to fine SAND, some coarse to fine gravel, trace silt.	4'
	5'
	6'
Fine content increased from 6 ft. and below.	7'
	8'
Water flowing in	9'
West Face: 0 1' 2' 3'	10'

i:\projects\11655665(Picatinny)\TestPits\TPB Series

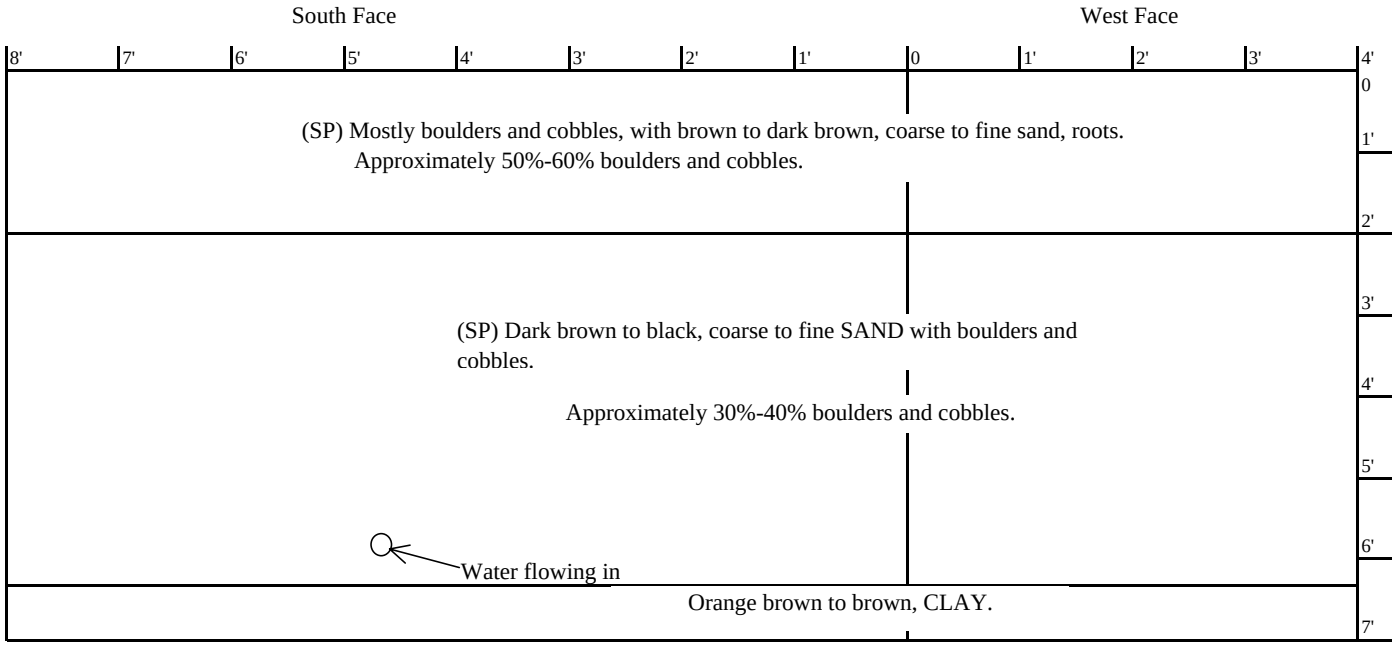
URS

LOG OF TEST PIT TPB-10

SHEET 1 OF 1

PROJECT NAME		APPROXIMATE GROUND SURFACE ELEVATION (FT)	COMPLETION DEPTH	PROJECT NUMBER
LOCATION	Explosives R&D Loading Facility Picatinny Arsenal, Dover, NJ	713 ft. (approx.)	7 ft.	11655665
EXCAVATION CONTRACTOR	FOREMAN	DATE STARTED	DATE COMPLETED	APPROX. DIMENSIONS (FT) L x W x D
Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	Mike Huber	May 03, 2004	May 03, 2004	8 ft. x 4 ft. x 7 ft.
EXCAVATION EQUIPMENT		APPROXIMATE DEPTH TO WATER LEVEL (FT)	INSPECTOR	VIEW
Caterpiller 426 Backhoe		6 ft.	Chang Oh	
EXCAVATION LOCATION				HORIZONTAL SCALE
				NTS

Description	Depth (ft)



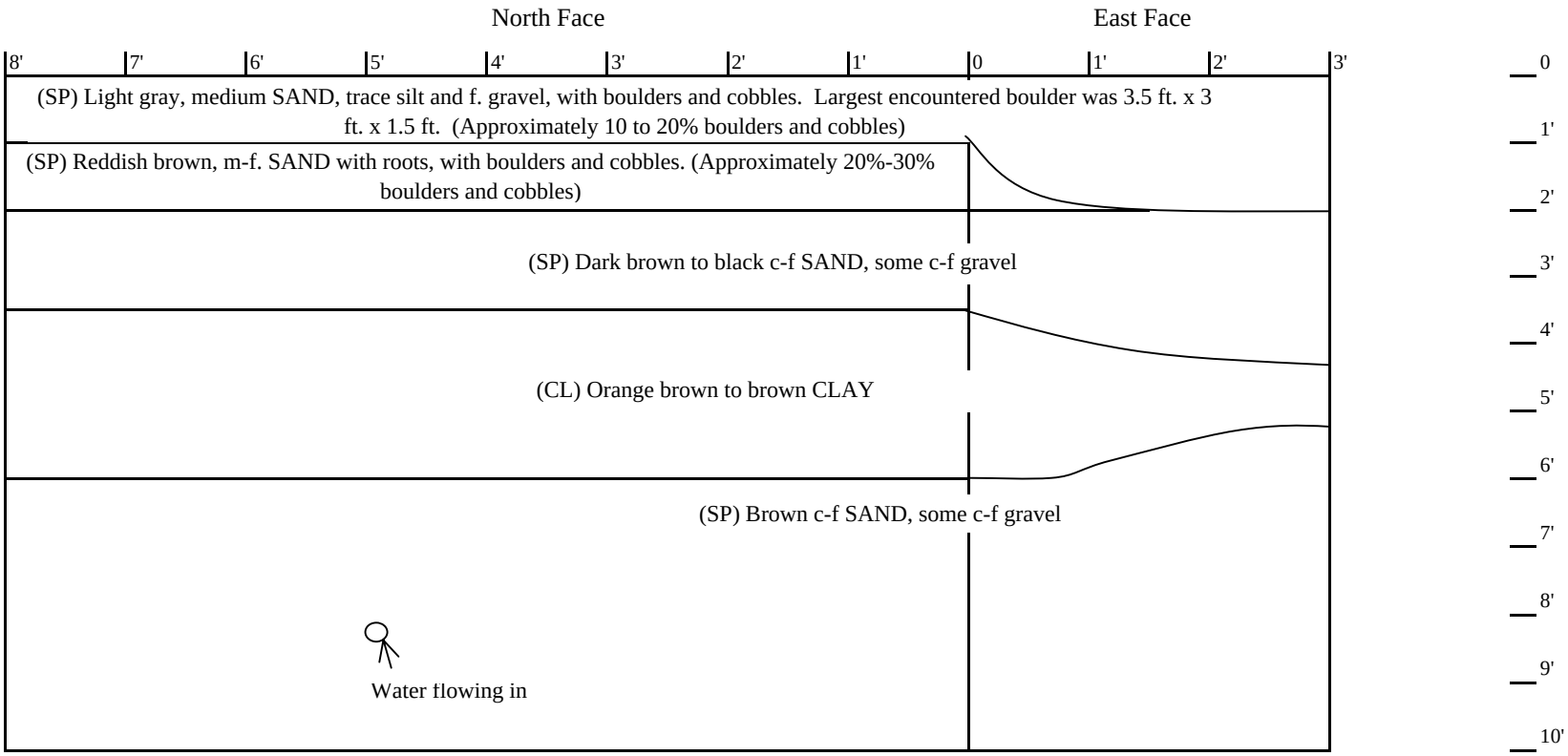
URS

LOG OF TEST PIT TPB-11

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 712	COMPLETION DEPTH: 10 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 03, 2004	DATE COMPLETED: May 03, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 3 ft. x 10 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): 8	INSPECTOR: Chang Oh	VIEW:
EXCAVATION LOCATION:				HORIZONTAL SCALE: NTS

Description | Depth (ft)

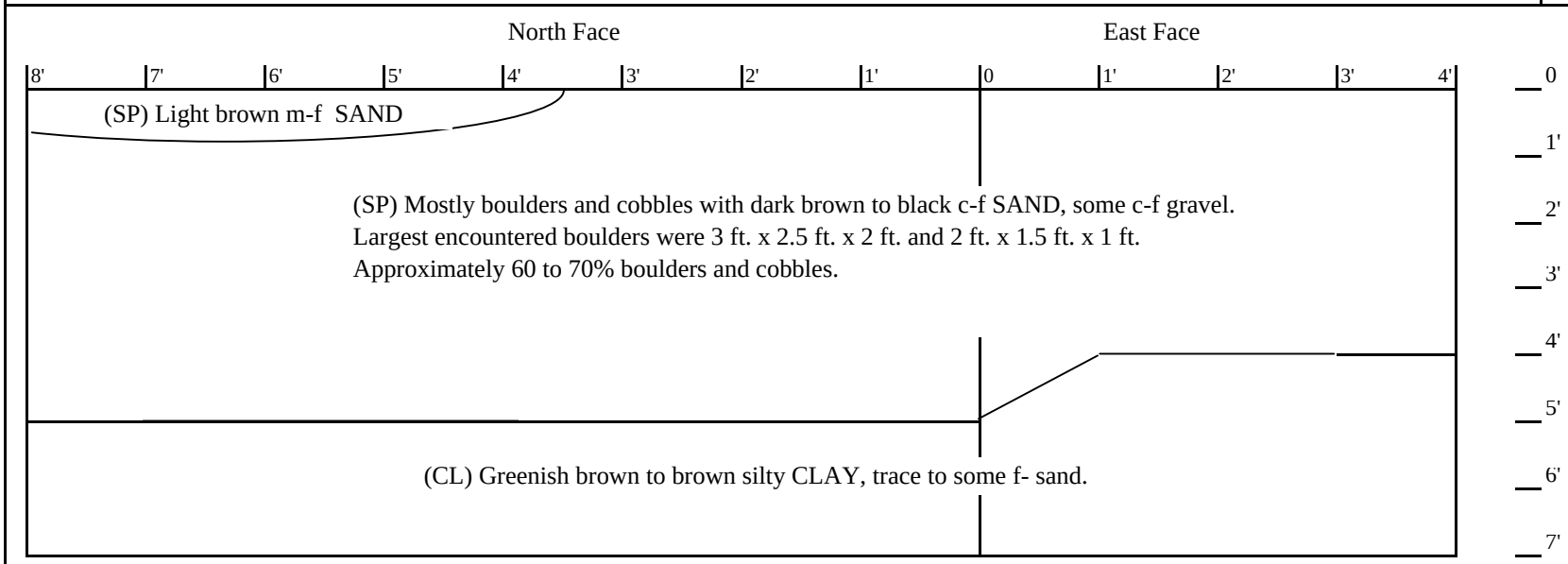


URS

LOG OF TEST PIT TPB-12

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 712	COMPLETION DEPTH: 7 ft.	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 03, 2004	DATE COMPLETED: May 03, 2004	APPROX. DIMENSIONS (FT) L x W x D: 8 ft. x 4 ft. x 7 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): N/A	INSPECTOR: C. Oh	VIEW:
EXCAVATION LOCATION:				HORIZONTAL SCALE: NTS



Description | Depth (ft)

URS

LOG OF TEST PIT TPB-14

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 8 ft	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 03, 2004	DATE COMPLETED: May 03, 2004	APPROX. DIMENSIONS (FT) L x W x D: 10 ft. x 4.5 ft. x 8 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): NA	INSPECTOR: Chang Oh	VIEW:
EXCAVATION LOCATION:				HORIZONTAL SCALE: NTS

Description	Depth (ft)

South Face: 10' | 8' | 6' | 4' | 2'

West Face: 0 | 2' | 4' | 4.5'

(SP) Light brown to brown m-f. SAND, some c-f gravel.

(SP) Brown c-f. SAND, some c-f gravel with approximately 30-40 % boulders and cobbles.

(CL) Reddish brown to brown CLAY.

0 1' 2' 3' 4' 5' 6' 7' 8'

NOTE: Very hard boulder encountered around 2' - 4'

URS

LOG OF TEST PIT TPB- 15

SHEET 1 OF 1

PROJECT NAME		APPROXIMATE GROUND SURFACE ELEVATION (FT)	COMPLETION DEPTH	PROJECT NUMBER
LOCATION	Explosives R&D Loading Facility Picatinny Arsenal, Dover, NJ	716	7.5 ft	11655665

EXCAVATION CONTRACTOR	FOREMAN	DATE STARTED	DATE COMPLETED	APPROX. DIMENSIONS (FT) L x W x D
Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	Mike Huber	May 03, 2004	May 03, 2004	10 ft. x 4.5 ft. x 7.5 ft.

EXCAVATION EQUIPMENT	APPROXIMATE DEPTH TO WATER LEVEL (FT)	INSPECTOR	VIEW
Caterpiller 426 Backhoe	NA	Chang Oh	

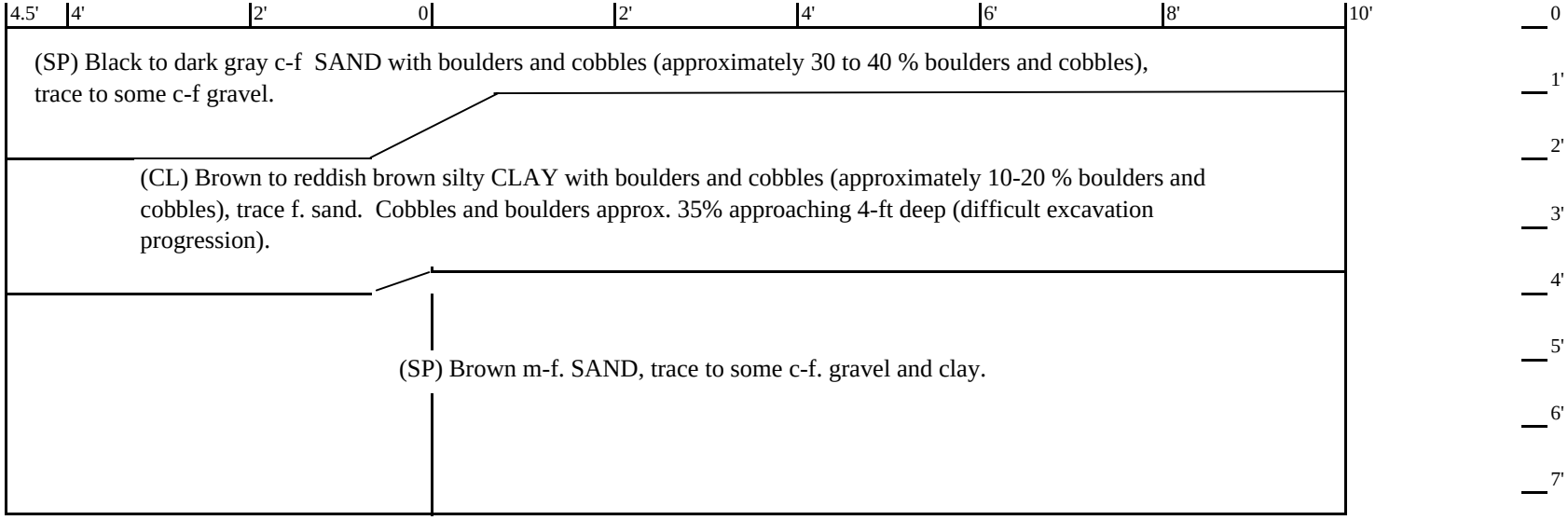
EXCAVATION LOCATION	HORIZONTAL SCALE
	NTS

Description	Depth (ft)

East Face

South Face

4.5' 4' 2' 0 2' 4' 6' 8' 10'



0 1' 2' 3' 4' 5' 6' 7' 8'

10" of concrete pavement observed below Phipps road.

URS

LOG OF TEST PIT TPB-16

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 716	COMPLETION DEPTH: 8.5 ft	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 03, 2004	DATE COMPLETED: May 03, 2004	APPROX. DIMENSIONS (FT) L x W x D: 9.5 ft. x 4 ft. x 8.5 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): 7	INSPECTOR: Chang Oh	VIEW:
EXCAVATION LOCATION:				HORIZONTAL SCALE: NTS

Description	Depth (ft)

East Face

9.5' 8' 6' 4' 2'

South Face

0 2' 4'

(SP) Gray to dark brown m-f. SAND, trace to some c-f. gravel, some cobbles and boulders, trace silt.

(SP) Light brown to brown c-f. SAND, some clay, trace to some c-f. gravel with boulders and cobbles.

Largest encountered boulder is 3 ft x 2.5 ft x 2 ft.
Approximately 30- 40 % boulders and cobbles.

water flowing in at 7 ft.

Same as above, but more fines

0
1'
2'
3'
4'
5'
6'
7'
8'
8.5'

URS

LOG OF TEST PIT TPB-17

PROJECT NAME		APPROXIMATE GROUND SURFACE ELEVATION (FT)	COMPLETION DEPTH	PROJECT NUMBER
Explosives R&D Loading Facility				
LOCATION		APPROXIMATE GROUND SURFACE ELEVATION (FT)	COMPLETION DEPTH	PROJECT NUMBER
Picatinny Arsenal, Dover, NJ		718	6 ft	11655665
EXCAVATION CONTRACTOR	FOREMAN	DATE STARTED	DATE COMPLETED	APPROX. DIMENSIONS (FT) L x W x D
Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	Mike Huber	May 03, 2004	May 03, 2004	10 x 4 x 6
EXCAVATION EQUIPMENT		APPROXIMATE DEPTH TO WATER LEVEL (FT)	INSPECTOR	VIEW
Caterpiller 426 Backhoe		7	Chang Oh	
EXCAVATION LOCATION				HORIZONTAL SCALE
				NTS

Description	Depth (ft)

North Face

10' 8' 6' 4' 2'

East Face

0 2' 4'

0

1'

(GP) Black to dark gray c-f. GRAVEL, some c-f. sand, with cobbles and boulders (Approx. 50 to 60 % boulders and cobbles).
Largest encountered boulder is 4 ft. x 3 ft. x 1.5 ft.

2'

3'

(SM) Orange brown to brown silty c-f. SAND , some clay, cobbles (Approx 30- 40% cobbles).

4'

5'

6'

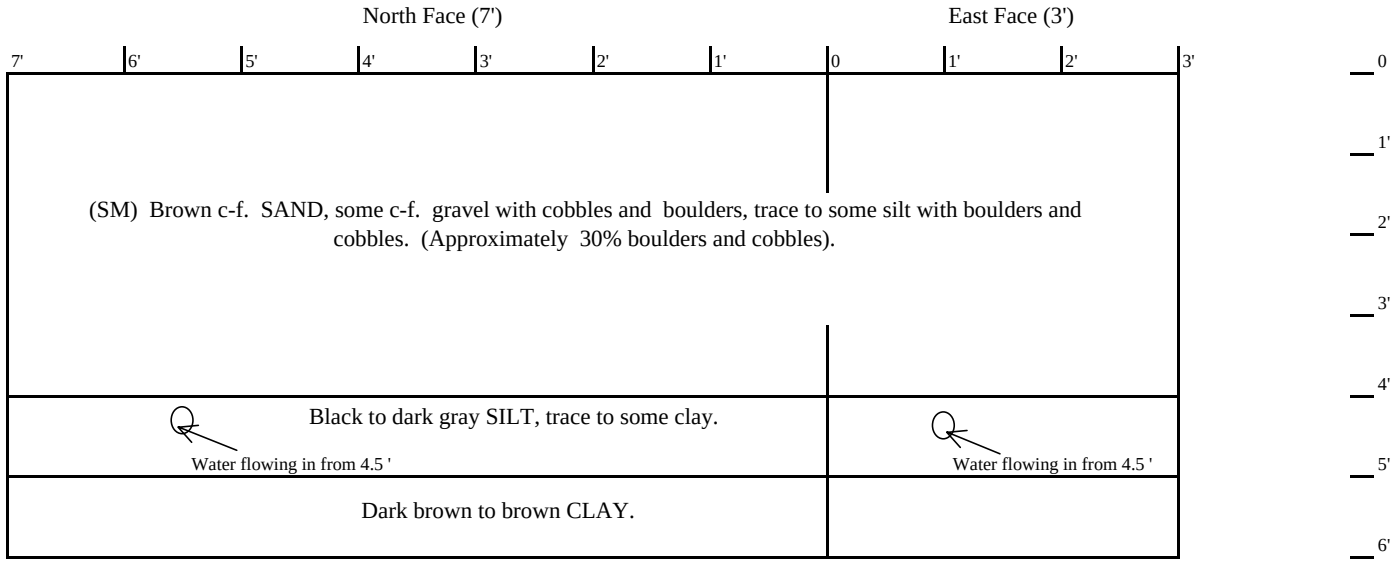
URS

LOG OF TEST PIT TPB-18

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility LOCATION: Picatinny Arsenal, Dover, NJ		APPROXIMATE GROUND SURFACE ELEVATION (FT): 710	COMPLETION DEPTH: 6 ft	PROJECT NUMBER: 11655665
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 04, 2004	DATE COMPLETED: May 04, 2004	APPROX. DIMENSIONS (FT) L x W x D: 7 ft. x 3 ft. x 6 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4.5	INSPECTOR: Chang Oh	VIEW
EXCAVATION LOCATION				HORIZONTAL SCALE: NTS

Description	Depth (ft)



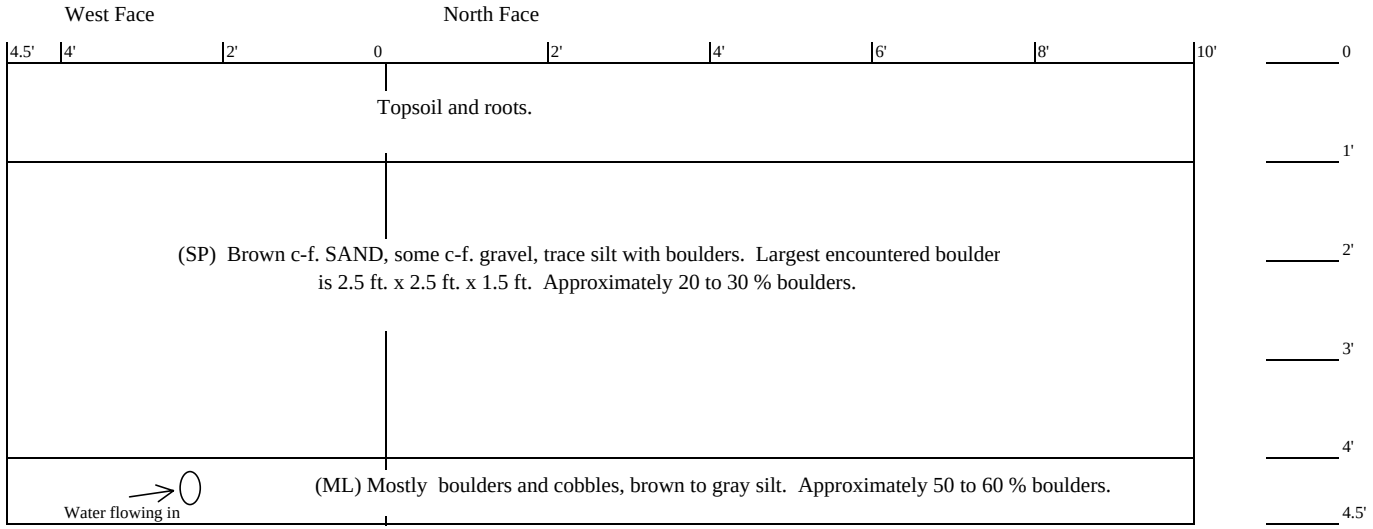
URS

LOG OF TEST PIT TPB-19

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility		APPROXIMATE GROUND SURFACE ELEVATION (FT): 710	COMPLETION DEPTH: 4.5 ft.	PROJECT NUMBER: 11655665
LOCATION: Picatinny Arsenal, Dover, NJ				
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 04, 2004	DATE COMPLETED: May 04, 2004	APPROX. DIMENSIONS (FT) L x W x D: 10 ft. x 4.5 ft. x 4.5 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4	INSPECTOR: Chang Oh	VIEW
EXCAVATION LOCATION			HORIZONTAL SCALE: NTS	

Description	Depth (ft)



URS

LOG OF TEST PIT TPB-20

SHEET 1 OF 1

PROJECT NAME: Explosives R&D Loading Facility		APPROXIMATE GROUND SURFACE ELEVATION (FT): 109	COMPLETION DEPTH: 6 ft	PROJECT NUMBER: 11655665
LOCATION: Picatinny Arsenal, Dover, NJ				
EXCAVATION CONTRACTOR: Mike Fitzpatrick & Sons/Jersey Boring and Drilling Co., Inc.	FOREMAN: Mike Huber	DATE STARTED: May 04, 2004	DATE COMPLETED: May 04, 2004	APPROX. DIMENSIONS (FT) L x W x D: 9ft. x 3.5 ft. x 6.0 ft.
EXCAVATION EQUIPMENT: Caterpiller 426 Backhoe		APPROXIMATE DEPTH TO WATER LEVEL (FT): 4	INSPECTOR: Chang Oh	VIEW
EXCAVATION LOCATION			HORIZONTAL SCALE: NTS	

Description	Depth (ft)

North Face

9' 8' 6' 4' 2' 0

East Face

0 2' 3.5'

(SM) Mostly concrete and boulders with brick rubble. Black to dark gray c-f SAND, some silt and c-f gravel.

Encountered 2 ft. x 1.5 ft. x 1 ft. concrete piece and a 3 ft. x 2 ft. x 1.5 ft. boulder.
Approimately 60% boulders and cobbles.

Water flowing in

(CL) Greenish brown to gray CLAY

0
1'
2'
3'
4'
5'
6'

Test Pit TPB-1

Test Pit TPB-1

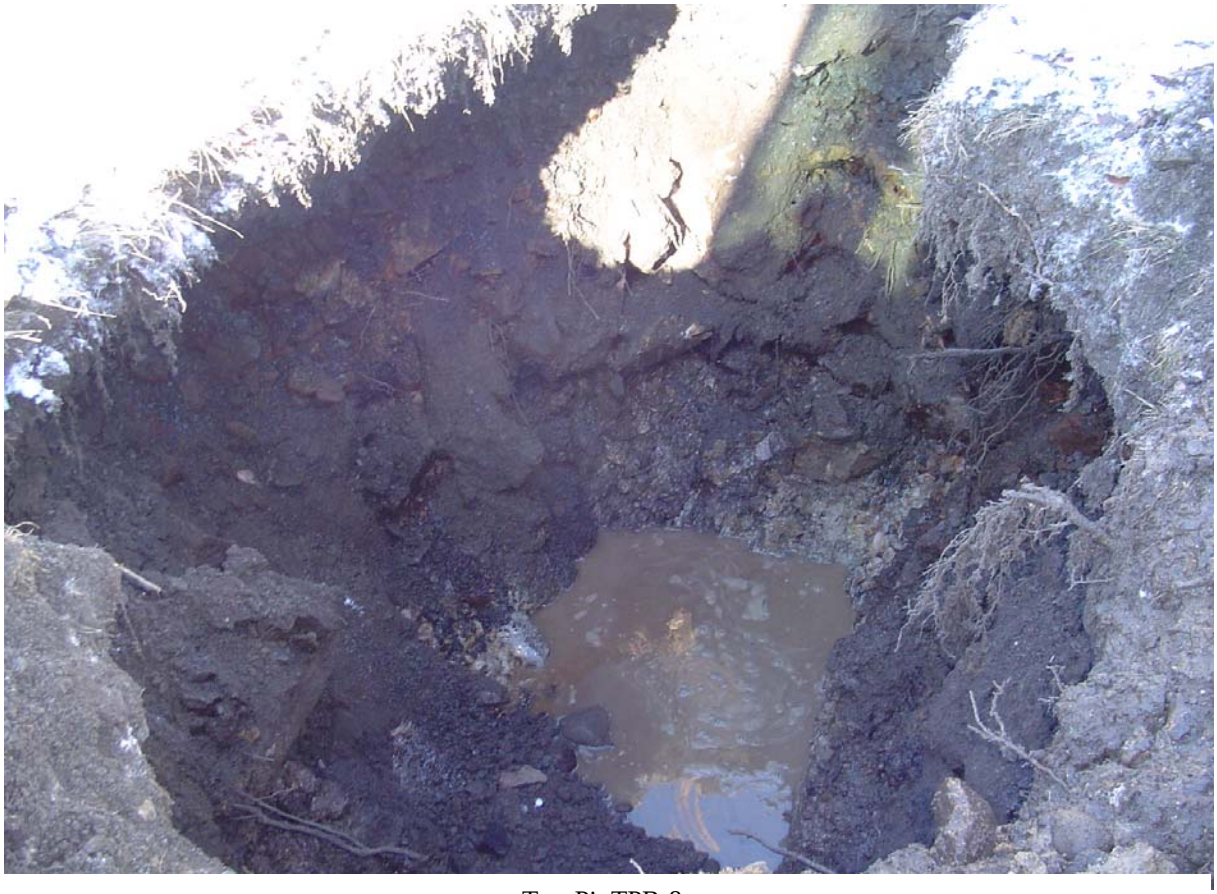
Test Pit TPB-4

Test Pit TPB-4

Test Pit TPB-5

Test Pit TPB-5

Test Pit TPB-8



Test Pit TPB-8

Test Pit TPB-9

Test Pit TPB-9

Test Pit TPB-9

Test Pit TPB-9

Test Pit TPB-10

Test Pit TPB-10

Test Pit TPB-10

Test Pit TPB-10

Test Pit TPB-11

Test Pit TPB-11

Test Pit TPB-11

Test Pit TPB-11

Test Pit TPB-12

Test Pit TPB-12

Test Pit TPB-12

Test Pit TPB-14

Test Pit TPB-14

Test Pit TPB-14

Test Pit TPB-15

Test Pit TPB-15

Test Pit TPB-15

Test Pit TPB-16

Test Pit TPB-16

Test Pit TPB-16

Test Pit TPB-16

Test Pit TPB-17

Test Pit TPB-17

Test Pit TPB-17

Test Pit TPB-18

Test Pit TPB-18

Test Pit TPB-18

Test Pit TPB-19

Test Pit TPB-19

Test Pit TPB-19

Test Pit TPB-19

Test Pit TPB-20

Test Pit TPB-20

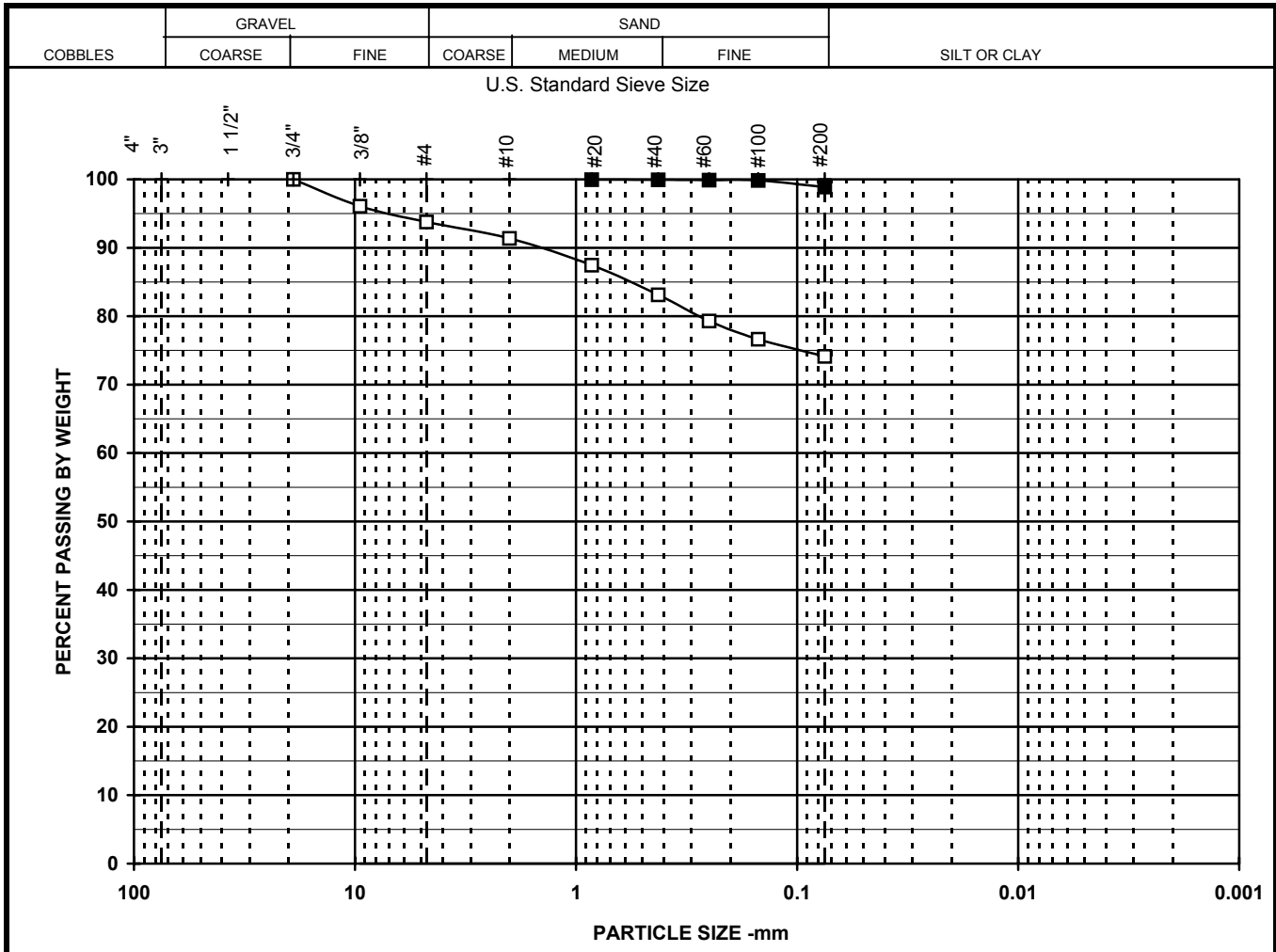
Test Pit TPB-20

APPENDIX B
LABORATORY TEST RESULTS

Picatinny Arsenal Explosive
R&D Loading Facility
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS			REMARKS
			WATER CONTENT (%)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	
B-1	S-2	5-7	19.2	CL	74.1	
B-1	S-4	15-17	26.4	ML	98.9	
B-2	S-1	1-3	13.3	SM	16.7	
B-2	S-5	20-22	23.6	ML	91.0	
B-3	S-3	10-12	10.2	SM	30.4	
B-3	S-4	15-17	10.2	SM	22.9	
B-4	S-2	5-7	11.1	SM	13.3	
B-4	S-5	20-22	21.6	ML	95.6	
B-4	S-9	40-42	26.4	ML	99.3	
B-5	S-2	5-7	17.1	SM	48.1	
B-5	S-3	10-12	11.2	SC	42.3	
B-5	S-5	20-22	24.5	ML	98.2	
B-6	S-2	5-7	8.2	SC	17.5	
B-6	S-3	10-12	19.4	CL	66.8	
B-7	S-1	0-2	13.2	SM	14.5	
B-7	S-3	10-12	13.2	SC	45.8	

Note: (1) Plasticity of fines for USCS symbol based on visual observation.



SYMBOL	DESCRIPTION AND REMARKS
□	light gray silty CLAY, some c-f sand, trace f. gravel.
■	gray SILT, trace f. sand.
○	

Symbol	□	■	○
Boring	B-1	B-1	
Sample	S-2	S-4	
Spec			
Depth	5-7	15-17	
% +3"			
% Gravel	6.2		
% SAND	19.7	1.1	
% FINES	74.1	98.9	
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	CL	ML	
w (%)	19.2	26.4	

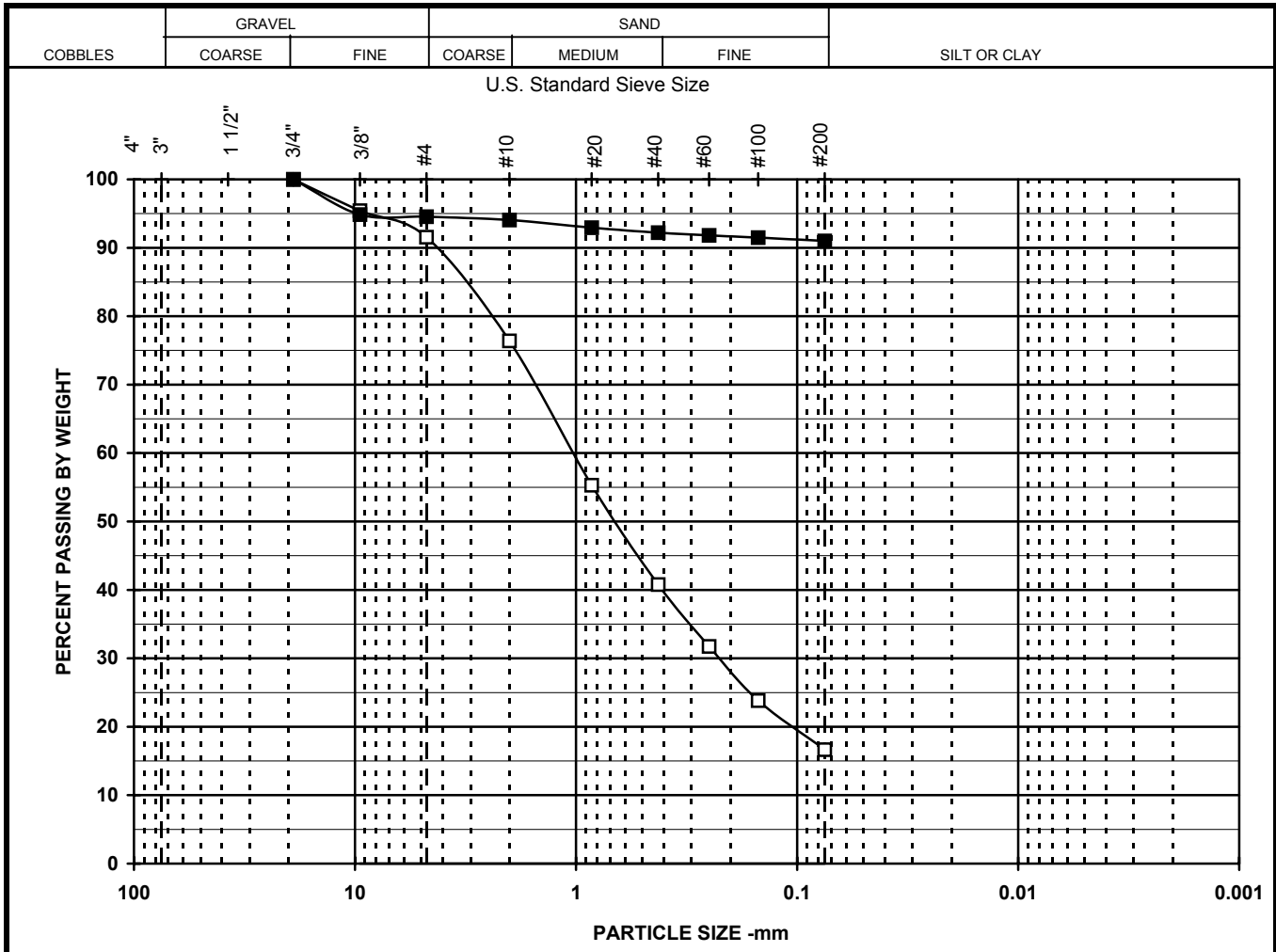
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0		
3/8"	96.1		
4	93.8		
10	91.4		
20	87.5	100.0	
40	83.1	99.9	
60	79.3	99.9	
100	76.6	99.8	
200	74.1	98.9	

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	black c-f SAND, some clayey silt, trace f. gravel.
■	light brown SILT, trace f. gravel, c-f sand.
○	

Symbol	□	■	○
Boring	B-2	B-2	
Sample	S-1	S-5	
Spec			
Depth	1-3	20-22	
% +3"			
% Gravel	8.4	5.4	
% SAND	74.9	3.6	
% FINES	16.7	91.0	
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM	ML	
w (%)	13.3	23.6	

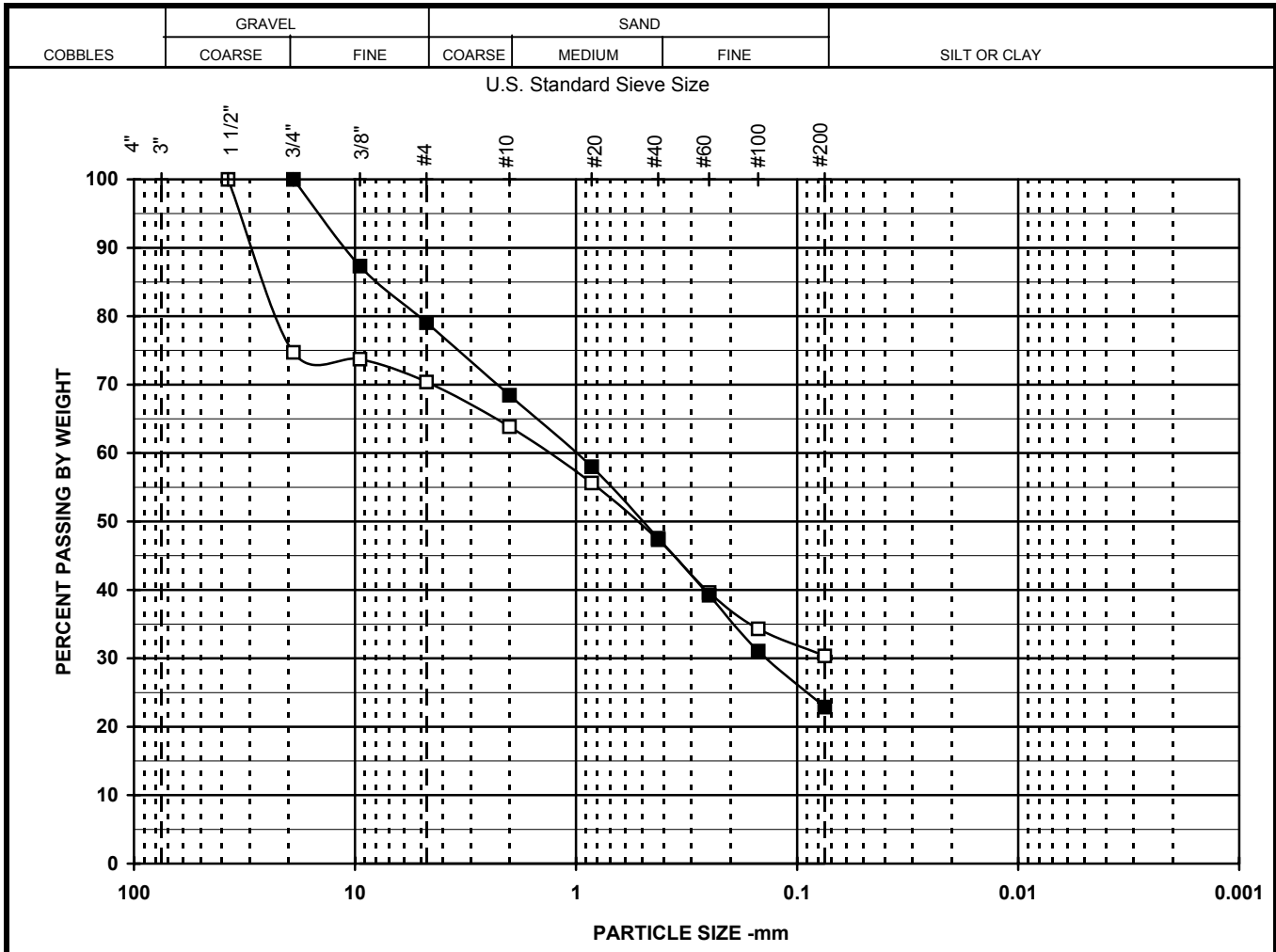
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0	100.0	
3/8"	95.4	94.9	
4	91.6	94.6	
10	76.4	94.1	
20	55.3	92.9	
40	40.8	92.2	
60	31.8	91.8	
100	23.8	91.5	
200	16.7	91.0	

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	yellow silty c-f SAND, some gravel.
■	brown c-f SAND, some f. gravel, silt.
○	

Symbol	□	■	○
Boring	B-3	B-3	
Sample	S-3	S-4	
Spec			
Depth	10-12	15-17	
% +3"			
% Gravel	29.6	20.9	
% SAND	40.0	56.2	
% FINES	30.4	22.9	
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM	SM	
w (%)	10.2	10.2	

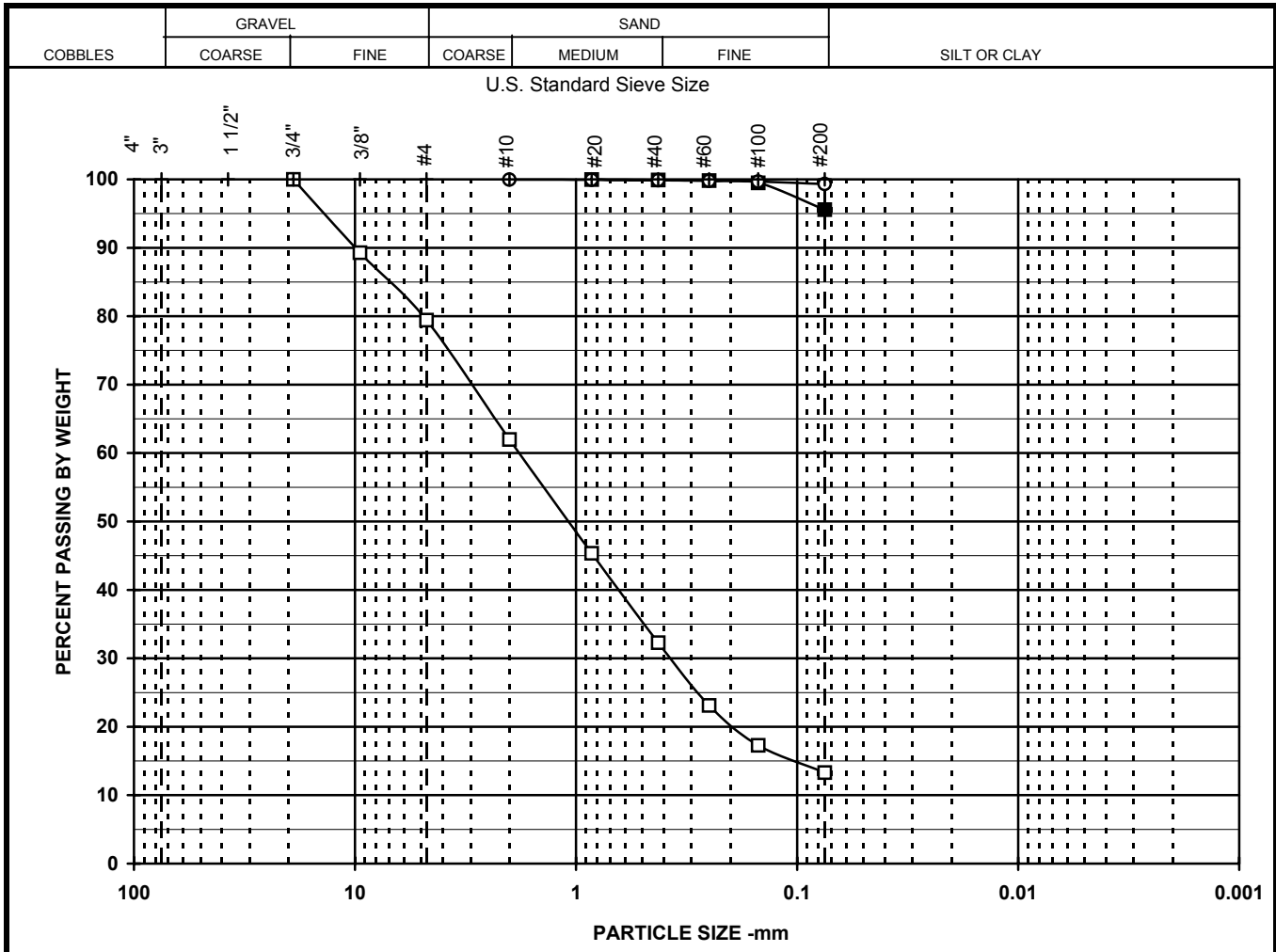
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"	100.0		
3/4"	74.7	100.0	
3/8"	73.7	87.3	
4	70.4	79.1	
10	63.9	68.5	
20	55.6	58.0	
40	47.3	47.6	
60	39.6	39.2	
100	34.3	31.1	
200	30.4	22.9	

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	orange c-f SAND, some f. gravel, silt.
■	light brown SILT, trace f. sand.
○	light gray SILT.

Symbol	□	■	○
Boring	B-4	B-4	B-4
Sample	S-2	S-5	S-9
Spec			
Depth	5-7	20-22	40-42
% +3"			
% Gravel	20.6		
% SAND	66.1	4.4	0.7
% FINES	13.3	95.6	99.3
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM	ML	ML
w (%)	11.1	21.6	26.4

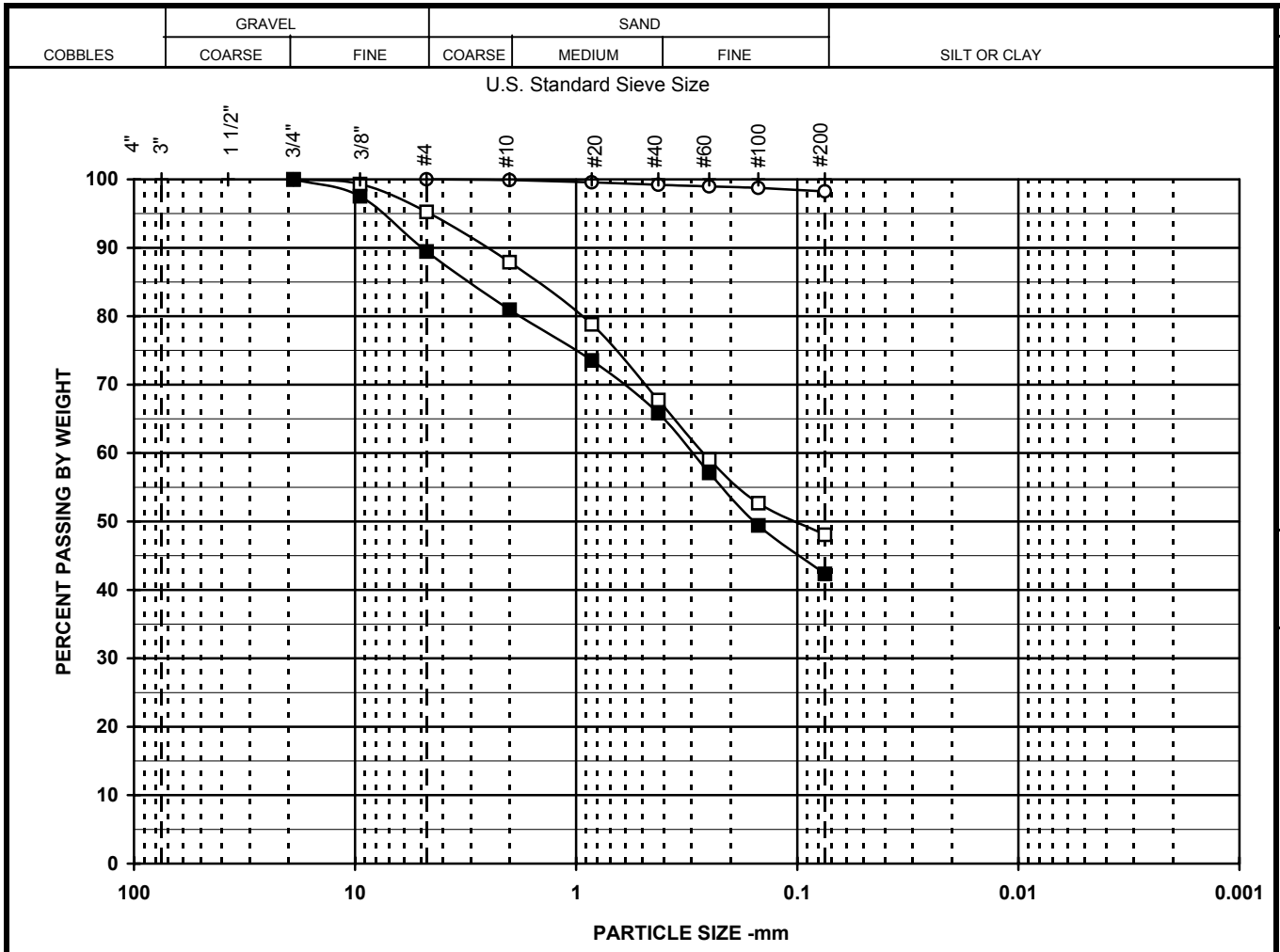
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0		
3/8"	89.3		
4	79.4		
10	62.0		100.0
20	45.4	100.0	99.9
40	32.3	99.9	99.9
60	23.1	99.8	99.8
100	17.3	99.5	99.7
200	13.3	95.6	99.3

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	light brown silty c-f SAND, trace f. gravel.
■	brown silty clayey c-f SAND, trace f. gravel.
○	light brown SILT, trace c-f sand.

Symbol	□	■	○
Boring	B-5	B-5	B-5
Sample	S-2	S-3	S-5
Spec			
Depth	5-7	10-12	20-22
% +3"			
% Gravel	4.7	10.5	
% SAND	47.2	47.2	1.8
% FINES	48.1	42.3	98.2
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM	SC	ML
w (%)	17.1	11.2	24.5

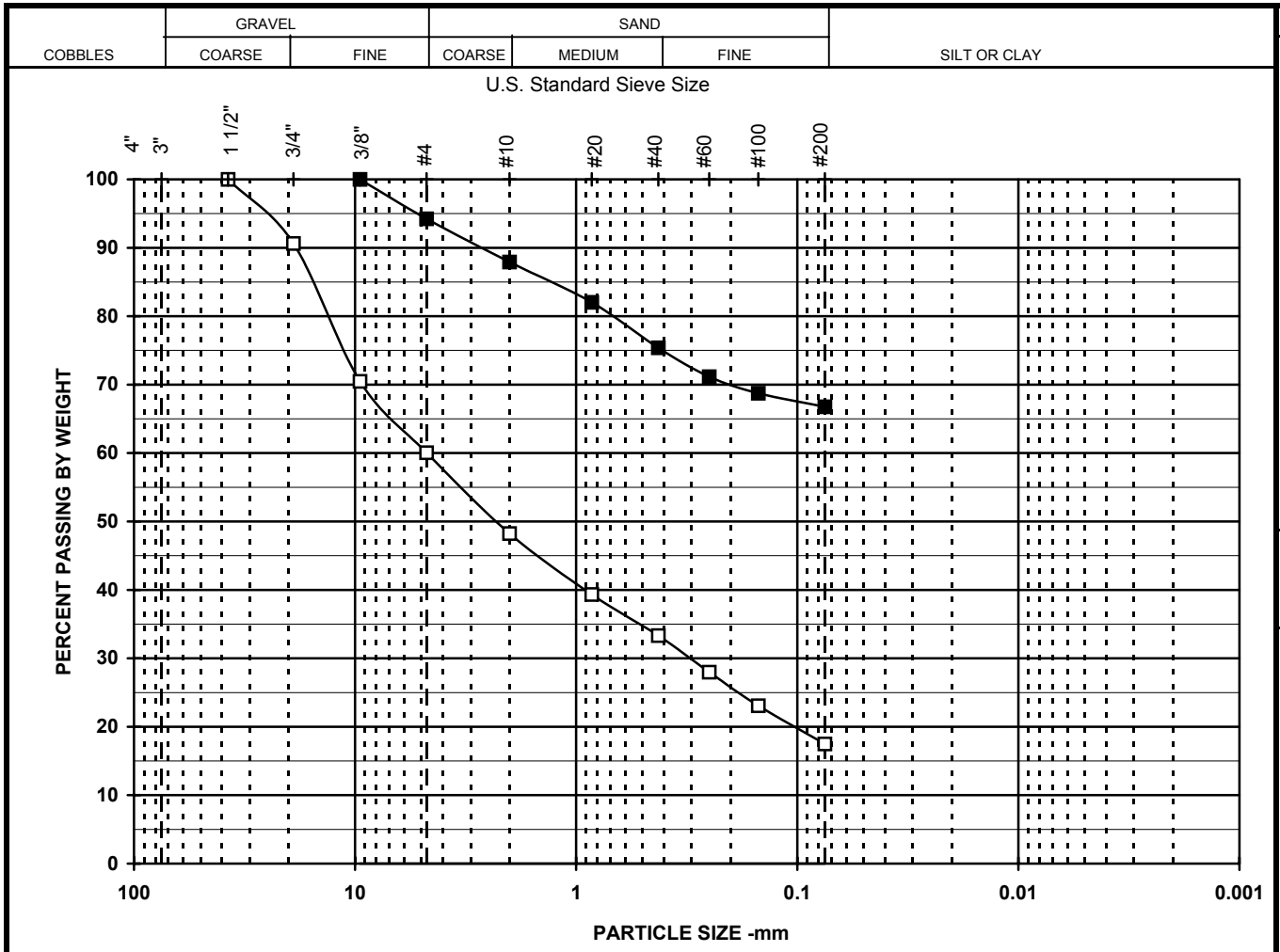
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"			
3/4"	100.0	100.0	
3/8"	99.3	97.5	
4	95.3	89.5	100.0
10	87.9	81.0	99.9
20	78.8	73.5	99.6
40	67.8	65.8	99.2
60	59.1	57.1	99.0
100	52.7	49.4	98.7
200	48.1	42.3	98.2

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

URS Corporation



SYMBOL	DESCRIPTION AND REMARKS
□	reddish brown gravelly c-f SAND, some clay.
■	reddish brown CLAY, some c-f sand, trace f. gravel.
○	

Symbol	□	■	○
Boring	B-6	B-6	
Sample	S-2	S-3	
Spec			
Depth	5-7	10-12	
% +3"			
% Gravel	39.9	5.8	
% SAND	42.6	27.4	
% FINES	17.5	66.8	
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SC	CL	
w (%)	8.2	19.4	

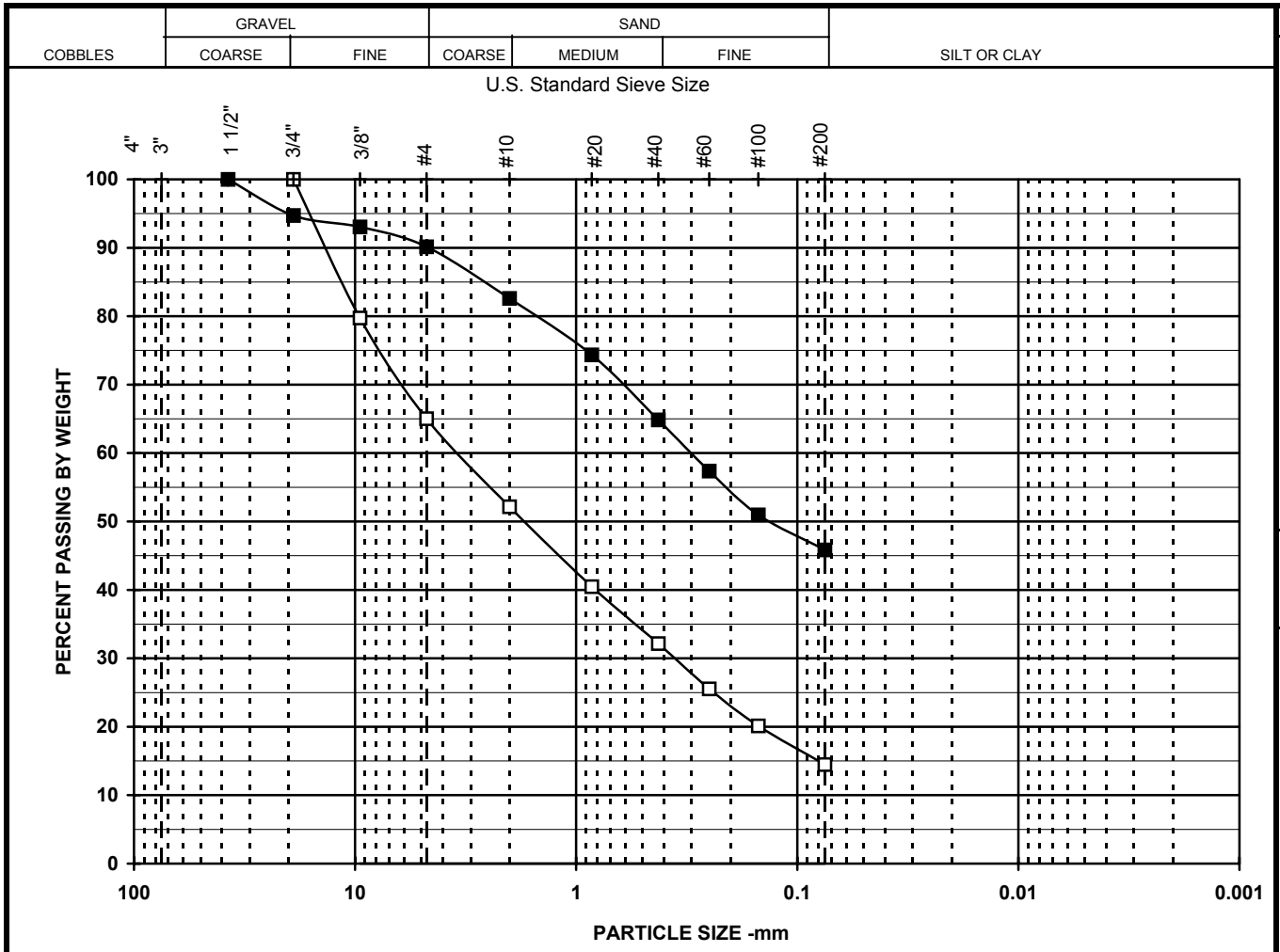
Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"	100.0		
3/4"	90.6		
3/8"	70.5	100.0	
4	60.1	94.2	
10	48.2	87.9	
20	39.3	82.0	
40	33.3	75.4	
60	28.0	71.2	
100	23.1	68.7	
200	17.5	66.8	

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

URS Corporation



Symbol	□	■	○
Boring	B-7	B-7	
Sample	S-1	S-3	
Spec			
Depth	0-2	10-12	
% +3"			
% Gravel	35.0	9.8	
% SAND	50.5	44.4	
% FINES	14.5	45.8	
% -2μ			
Cc			
Cu			
LL			
PL			
PI			
USCS	SM	SC	
w (%)	13.2	13.2	

Particle Size	PERCENT FINER		
(Sieve #)	□	■	○
4"			
3"			
1 1/2"		100.0	
3/4"	100.0	94.7	
3/8"	79.7	93.1	
4	65.0	90.2	
10	52.2	82.6	
20	40.5	74.4	
40	32.2	64.9	
60	25.5	57.4	
100	20.1	51.0	
200	14.5	45.8	

SYMBOL	DESCRIPTION AND REMARKS
□	black f. gravelly c-f SAND, some silt.
■	light brown clayey c-f SAND, trace gravel.
○	

PARTICLE SIZE DISTRIBUTION

Picatinny Arsenal Explosive Facility

Project No.		Figure
11655665	April 2004	

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